

11-6625-1704-15

TM 11-6625-1704-15

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR
ORGANIZATIONAL, DS, GS
AND
DEPOT MAINTENANCE MANUAL
INCLUDING
REPAIR PARTS AND SPECIAL TOOL LISTS

TEST SET
ELECTRONIC SYSTEM AN/ASM-338

This copy is a reprint which includes current
pages from Changes 1 and 2.

HEADQUARTERS, DEPARTMENT OF THE ARMY
MARCH 1968

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WARNING

**DANGEROUS VOLTAGES EXIST IN THIS EQUIPMENT
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CHANGE }
NO. 2 }

TM 11-6625-1704-15

C 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 30 July 1976

**Operator's, Organizational, Direct Support,
General Support and Depot Maintenance Manual
TEST SET ELECTRONIC SYSTEM AN/ASM-338
(NSN 6625-00-818-7990)**

TM 11-6625-1704-15, 29 March 1968, is changed as follows:

1. Title of this manual is changed as shown above.
2. New or changed material will be indicated by a vertical bar.
3. Remove old pages and insert new pages as indicated below.

Remove	Insert
i and ii	i and ii
1-1 through 1-4	1-1 through 1-4
4-1 and 4-2	4-1 and 4-2
8-1 and 8-2	8-1 and 8-2
9-1 through 9-4	9-1 through 9-3 (9-4 blank)
C-1 through C-4	C-1 through C-4
D-1 through D-13	None
1-1 and 1-2	1-1 and 1-2

4. File this change in front of the manual for reference purposes.

By Order of the Secretary of the Army:

Official:

FRED C. WEYAND
General, United States Army
Chief of Staff

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Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-36A, organizational maintenance requirements for AN/ASM-338.

CHANGE

No. 1

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 20 May 1974

**Operator, Organizational, Direct Support, General Support,
and Depot Maintenance Manual
Including Repair Parts and Special Tools Lists
TEST SET, ELECTRONIC SYSTEM AN/ASM-338**

TM 11-6625-1704-15, 29 March 1968, is changed as follows:

1. A vertical bar appears opposite changed material.
2. Remove and insert pages as indicated in the page list below:

<i>Remove Pages</i>	<i>Insert Pages</i>
i and ii	i and ii
1-1 and 1-2	1-1 and 1-3
A-1 (A-2 blank)	A-1 (A-2 blank)
B-1 and B-2	None

3. File this change sheet in the front of the manual for reference purposes.

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

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Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-36A (qty rqr block No. 952) organizational maintenance requirements for AN/ASM-338.

TECHNICAL MANUAL

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HEADQUARTERS
DEPARTMENT OF THE ARMY
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**Operator's, Organizational, Direct Support,
General Support and Depot Maintenance Manual
TEST SET, ELECTRONIC SYSTEM AN/ASM-338
(NSN 6625-00-818-7990)**

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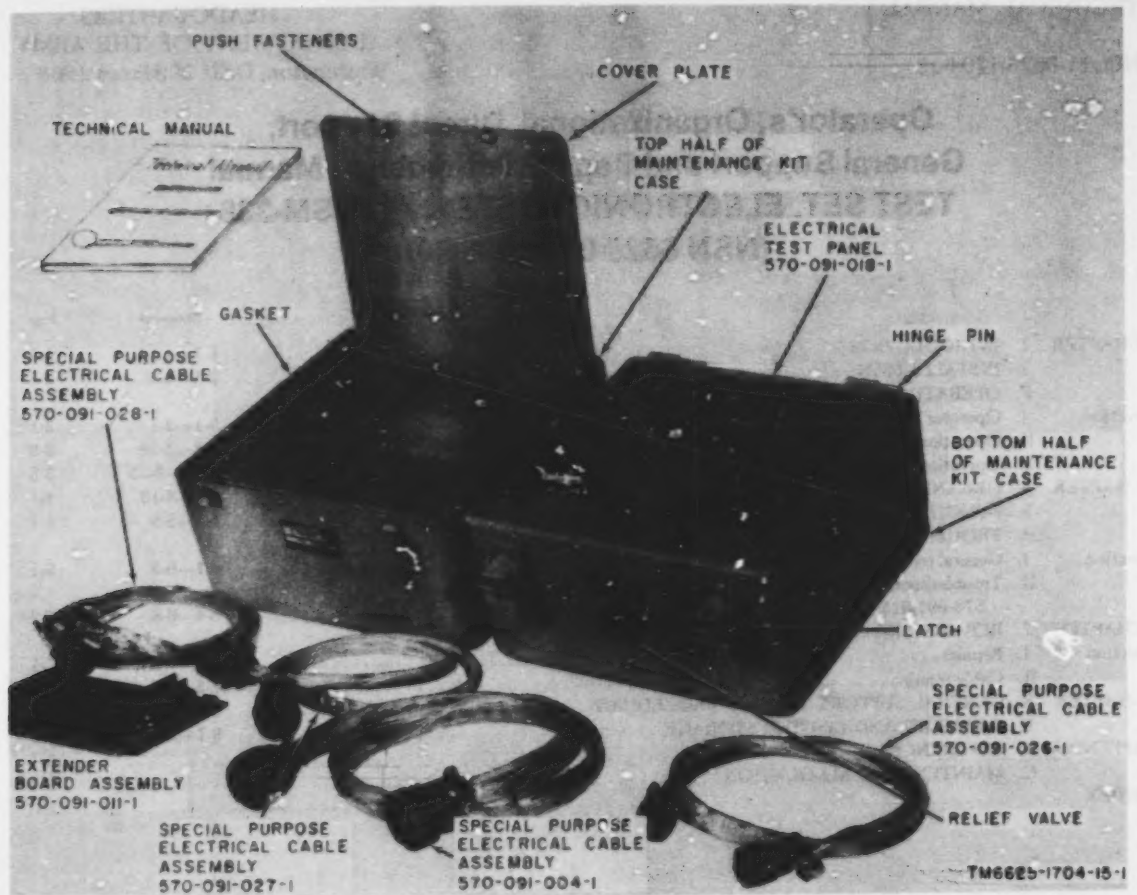


Figure 1-1. Electronic System Test Set AN/ASM-338.

CHAPTER 1

INTRODUCTION

1-1. Scope

a. This manual describes Electronic System Test Set AN/ASM-338 (fig. 1-1) and provides instructions for its operation and maintenance. It includes operation under usual and unusual conditions, cleaning and inspection of the equipment, replacement of parts, and repairs. It also includes a maintenance allocation chart (app C).

b. Refer to TM 11-1520-221-34 for detailed operating procedure for using Electronic System Test Set AN/ASM-338 in the maintenance of the model 570A Stability Augmentation System as installed in the AH-1G helicopter.

NOTE

The term Hertz (Hz) has been used throughout this manual to represent cycles per second.

1-2. Indexes of Publication

a. *DA Pam 310-4*. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. *DA Pam 310-7*. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

1-3. Forms and Records

a. *Reports of Maintenance and Unsatisfactory Equipment*. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. *Report of Packaging and Handling Deficiencies*. Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 700-58/AFR 71-13, and DSAR 4145.8.

c. *Discrepancy in Shipment Report (DISREP) (SF 361)*. Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/AFR 75-18, and DSAR 4500.15.

1-4. Destruction of Army Electronics Materiel

Demolition and destruction of electronic equipment

will be under the direction of the commander and in accordance with TM 750-244-2.

1-5. Administrative Storage

For procedures, forms and records, and inspection required during administrative storage of this equipment, refer to TM 750-90-1.

1-6. Reporting of Errors

The reporting of errors, omissions, and recommendations for improving this equipment by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded direct to Commander, US Army Electronics Command, ATTN: DRSEL-MA-Q, Fort Monmouth, N. J. 07703.

1-7. Purpose and Use

a. Electronic System Test Set AN/ASM-338 is a portable test set that provides all of the necessary loads, signals, and interconnecting cables required for bench testing of the various components of the model 570A Stability Augmentation System. Specifically, this test set facilitates the maintenance of the 570-074-010-3 Sensor Amplifier Unit, 570-074-060-1 Control Panel, 570-074-037-1, -11, -15 Control Channel Assemblies, and the 570-074-131-1 Pylon Compensation Unit when removed from the helicopter.

b. The cable assemblies of the AN/ASM-338 provide innerconnection between the test set and the individual units to be tested. Storage for this accessory equipment is provided within the lid of the metal case of the AN/ASM-338.

c. The AN/ASM-338 can be connected to a 115-volt 400-Hz, 50-wa alternating current (ac) line and to 27.5 ± 2.0 volts, 5 amp. direct current (dc) power supply.

1-8. Technical Characteristics

Input power 115 volts ac 400 Hz, 50 wa. and
27.5 $\pm$ 2.0 volts DC, 5 amps.

Environmental
requirements:

Operating tempera-
range 0° C to 55° C, for continuous
operation; 0° C to 71° C, for
intermittent operation.

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Storage temperature range -62° C to +85° C.
Altitude range 0 to 10,000 feet (operating); 0 to 50,000 feet (not operating).

Watertightness Leakproof when the cover is on and latched.

Note. When the cover is unlatched, the control panel is not waterproof or rainproof.

Explosion This equipment is not to be operated in an explosive-type atmosphere; it is not sealed, and its switches are not sealed.

Weight 13 pounds.

1-9. Items Comprising an Operable Equipment

Equipment		Nomenclature, part no., mfr. code	Weight (lb)	Height	Dimensions (in)		Fig. No
NSN	Qty.				Depth	Width	
NOTE							
The part number if followed by the applicable 5-digit Federal supply code for manufacturers (FSCM) identified in SB 708-42 and used to identify manufacturer, distributor, or Government agency, etc.							
6625-00-878-7990	1	Test Set, Electronic System AN/ASM-338: 570-091-020-1; 797499 Which includes:	6.6	9½	4¾	9¾	1-1
6625-00-935-5181	1	Cable Assembly CX-10851/U; (3 ft 3 in.); 570-091-C04-1; 97499		36			1-1
6625-00-935-5178	1	* Cable Assembly CX-10853/U; (3 ft 3 in.); 570-091-027-1; 97499		36			1-2
6625-00-935-5179	1	Cable Assembly CX-10854/U; (6 ft 3 in.); 570-091-028-1; 97499		72			1-2
5826-00-879-7498	1	Extender Board Module MX-8096/ASM-338: 570-091-011-1; 97499		6½	4	1	1-2
6625-00-935-5180	1	Cable Assembly CX-10852/U; (3 ft 3 in.); 570-091-026-1; 97499		36			1-2

1-10. Description of Electronic System Test Set AN/ASM-338

Electronic System Test Set AN/ASM-338 (fig. 1-1) consists of Maintenance Kit Case BW1FA-20C20 containing Electrical Test Panel 570-091-018-1, special purpose accessories, and a copy of this manual (TM 11-6625-1704-15).

1-11. Maintenance Kit Case BW1FA20C20

a. Maintenance Kit Case BW1FA20C20 (fig. 1-1) is a two-piece metal case. The case serves both as a storage and transport case and as a means of mounting electrical test panel 570-091-018-1 and storing the special purpose accessories.

b. The top half of the case serves as a waterproof cover when it is secured to the bottom half by two hinges and locking the two latches. The gasket around the edge of the top half makes the joint watertight. The relief valve permits air to leave the case when the pressure inside exceeds that outside (as may happen, for example, during air transport at high

altitudes). A release button on the relief valve, when pressed, permits air to enter the case if the inside air pressure is lower and makes it easier to open.

c. The hinges on the top half of the case are separable from the hinge pins on the lower half, permitting the two halves to be separated for convenience in use.

d. Within the top half of the case, a hinged retaining plate provides a compartment for the accessory kit and the technical manual. The retaining plate is secured by two press type fasteners located along the edge opposite the hinges.

1-12. Electrical Test Panel 570-091-018-1

a. Electrical Test Panel 570-091-018-1 is mounted in the bottom half of the BW1FA20C20 and secured by eight attachment screws. The panel face contains all necessary controls for operation of the AN/ASM-338.

b. The 570-091-018-1 panel face provides mounting for all necessary input points, and output points, terminations, controls, components, power sources,

and switching provisions to enable a technician to conduct a specific test.

c. Each face component is identified with either functional marking or reference designation adjacent to its location.

d. Operating power is obtained from any 115-volt 400-Hz, 50-wa alternating current source and 27.5 $\pm$ 2.0-volt 5-amp dc source.

1-13. Accessory Kit

a. The accessory kit (fig 1-2) consists of 4 cable assemblies, and 570-091-011-1 Extender Board Assembly.

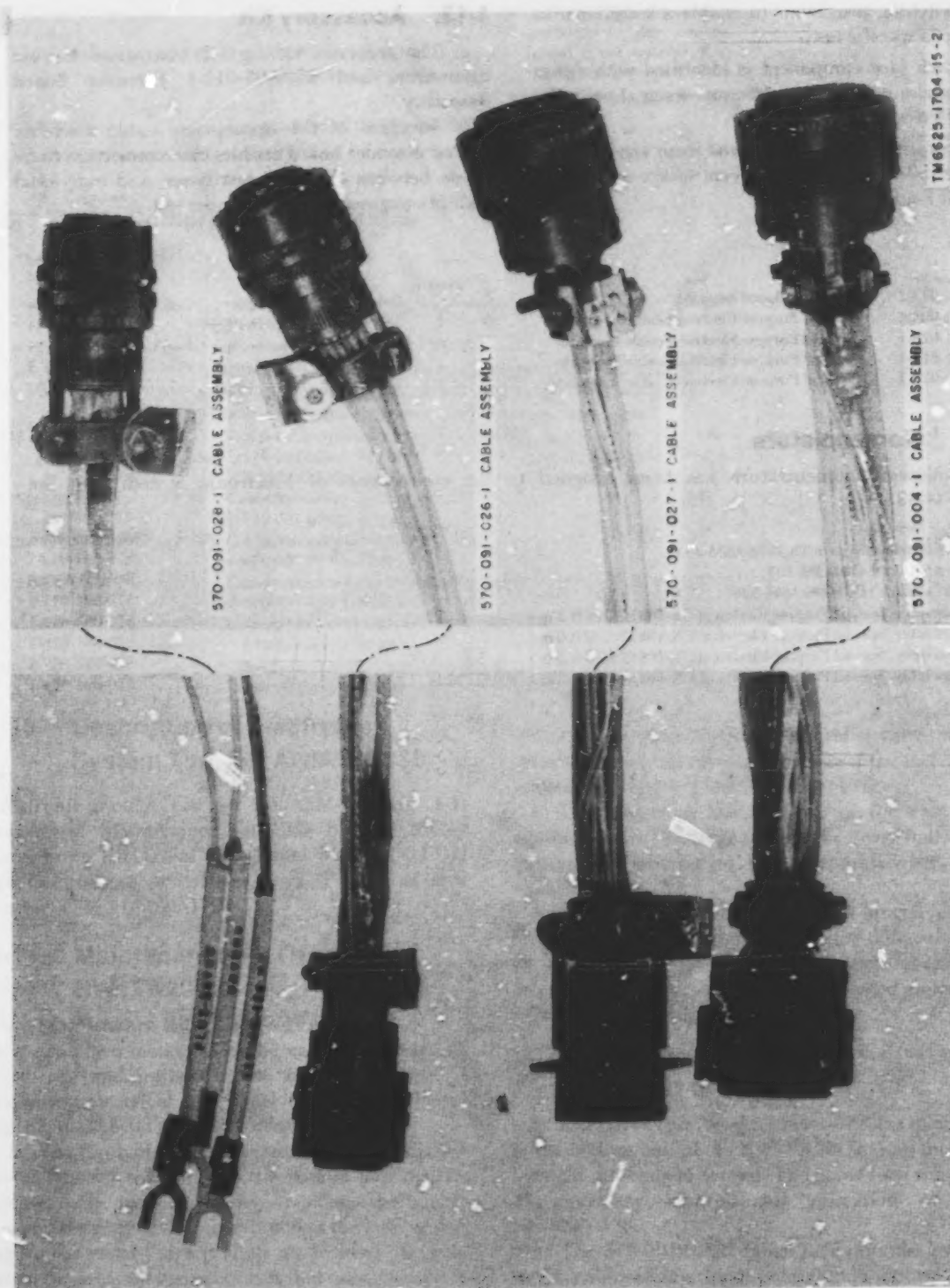
b. Selection of the appropriate cable assembly and/or extender board enables interconnection to be made between electrical test panel and individual stability augmentation unit under test.

Type No.	Name	Quantity	Use	Test panel connector No.
570-091-011-1	Extender Board Assembly	1	Control channel Adapter	TJ4
570-091-004-1	Special Purpose Electrical cable Assembly ..	1	Test Panel to Amplifier Unit	TJ1
570-091-026-1	Special Purpose Electrical cable Assembly ..	1	Test Panel to pylon compensation Unit	TJ5
570-091-027-1	Special Purpose Electrical cable Assembly ..	1	Test Panel to control panel	TJ2
570-091-028-1	Special Purpose Electrical cable Assembly ..	1	Test Panel to Power supply	TJ3

1-14. Nomenclature

The following nomenclature has been assigned to the components of Electronic System Test Set AN/ASM-338.

Nomenclature	Manufacturer's part no.
Test Set, Electronic System TS-2676/ASM-338	570-091-015-1
Case, Test Set CY-6470/ASM-338	BW1FA20C20
Extender, Module MX-8096/ASM-338	570-091-011-1
Cable Assembly, Special Purpose Electrical CX-10851/U (3 ft 3 in.)	570-091-004-1
Cable Assembly, Special Purpose Electrical CX-10852/U (3 ft 3 in.)	570-091-026-1
Cable Assembly, Special Purpose Electrical CX-10853/U (3 ft 3 in.)	570-091-027-1
Cable Assembly, Special Purpose Electrical CX-10854/U (6 ft 3 in.)	570-091-028-1



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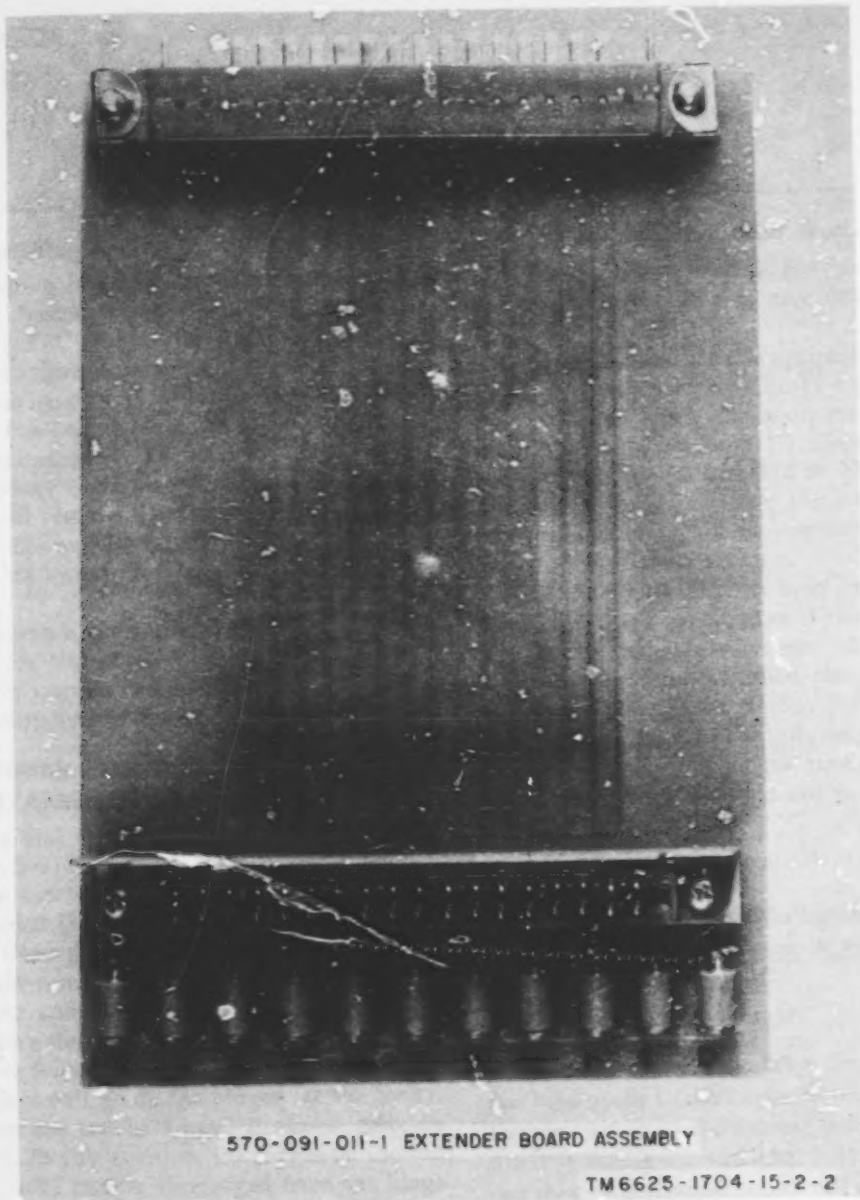


Figure 1-3. Electronic system Test Set AN/ASM-338, extender board assembly.

CHAPTER 2

INSTALLATION

2-1. Unpacking

a. Packaging Data. When packed for shipment Electronic System Test Set AN/ASM-338 is placed in a V3C carton (fig. 2-1) that has been padded with filler material. The inside of the box is 14 inches long by 14 inches wide by 14 inches high. The box has a volume of 1.6 cubic foot and weighs approximately 15 pounds.

b. Removing Contents of Packing Box. Open the box, and remove Electronic System Test Set AN/ASM-338 as follows:

- (1) Cut waterproof tape and fold back the top flaps.
- (2) Remove the top and side filler pads.
- (3) Lift out test set.
- (4) Salvage the box and filler pads for future reuse, for shipment or limited storage.

2-2. Opening Electronic System Test Set AN/ASM-338

a. Press and release the button on the relief valve (fig. 2-2).

b. Open the two latches as follows: pull each spring-loaded latch tab out to its fully extended position. Disengage the latch hook from the latch groove and release the tab. The latch hook will move down and away from the latch groove.

c. Remove the top half of the case from the bottom half as follows: raise the top half at the front as high as it will go on the hinges (at the back), then lower the top half until it almost rests on its handle. In this position, the hinges on the top half (fig. 1-1) can be disengaged from the hinge pins on the bottom half.

d. Open the accessory kit compartment as follows: release the two press type fasteners on the retaining plate by depressing and releasing them; then use the fasteners to lift the plate up and swing it back as far as will go.

e. Check to see that the accessory kit compartment contains accessories as shown in figure 1-1 and a copy of this manual.

2-3. Checking Unpacked Equipment

a. Inspect the equipment for damage incurred during shipment. Report any damages on DD Form 6 (para 1-3).

b. Check to see that the equipment is complete as listed on the packing slip. If a packing slip is not available, check the equipment against the basic issue items list (app. B). Report all discrepancies in accordance with TM 38-750. Shortage of a minor assembly or part that does not affect proper functioning of the equipment should not prevent use of the equipment.

c. If the equipment has been used or reconditioned, check to see whether it has been changed by a modification work order (MWO). If the equipment has been modified, the MWO number will appear on the front (fig. 2-2) near the nomenclature plate. If modified, see that any operational instruction changes resulting from the modification have been entered in the equipment manual.

Note. Current MWO's applicable to the equipment are listed in DA Pam 310-7.

d. If the equipment is to be shipped or stored after inspection, repackage it as instructed in chapter 9.

2-4. Connections

After Electronic System Test Set AN/ASM-338 has been opened (para 2-2a through c), stand the bottom half so that electrical test panel 570-091-018-1 is facing upward (fig. 3-4). The test panel can then be connected to 115 volts, 400 Hz ac and to dc power supply for operating as follows:

a. Check that power supply source (ac and dc) is deenergized (OFF).

b. Remove special purpose electrical cable assembly 570-091-028-1 from its stow position in case lid of AN/ASM-338.

c. Connect terminal labeled 115V ac 400 Ω 1 ϕ to appropriate terminal of ac power source.

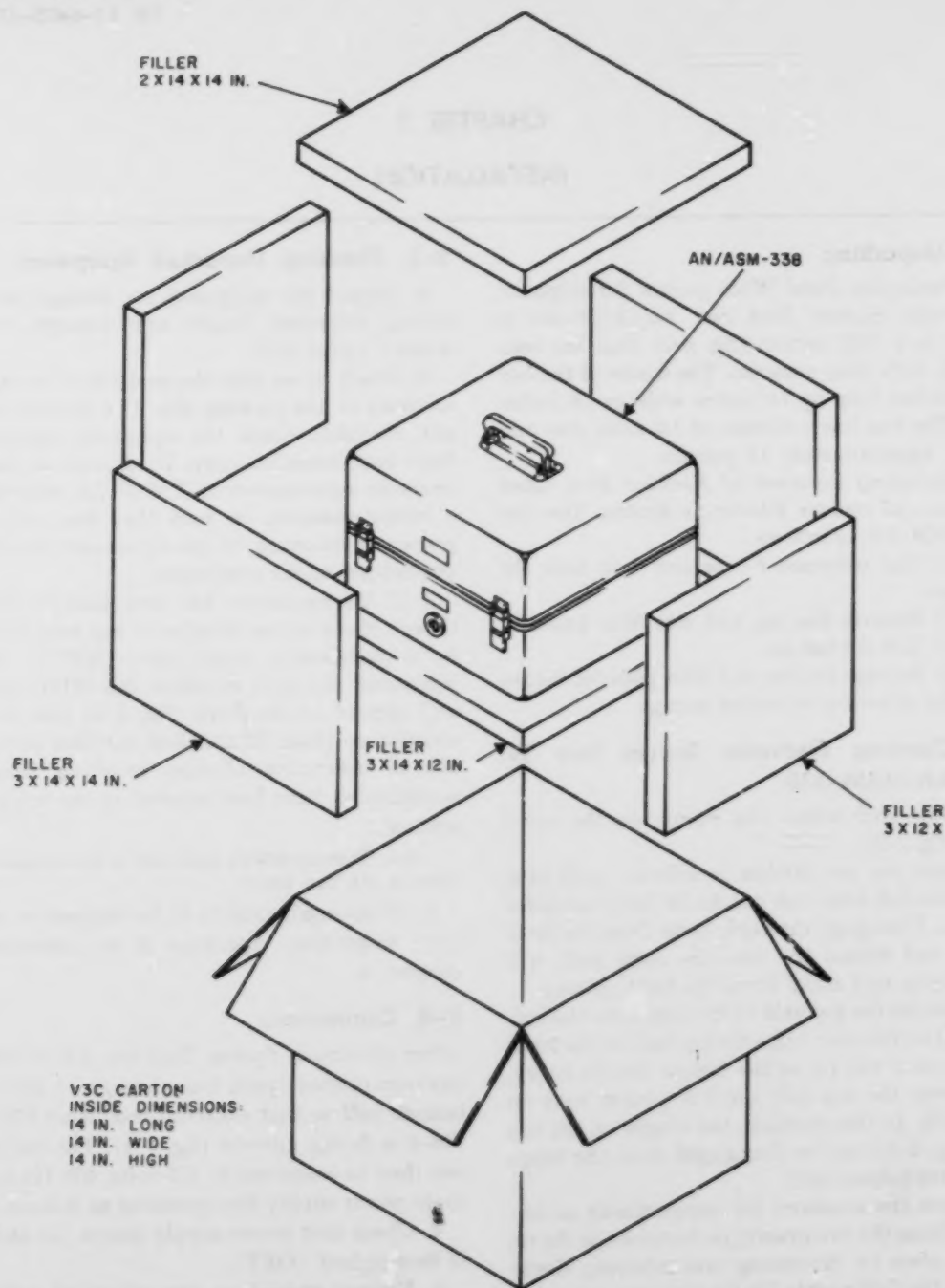


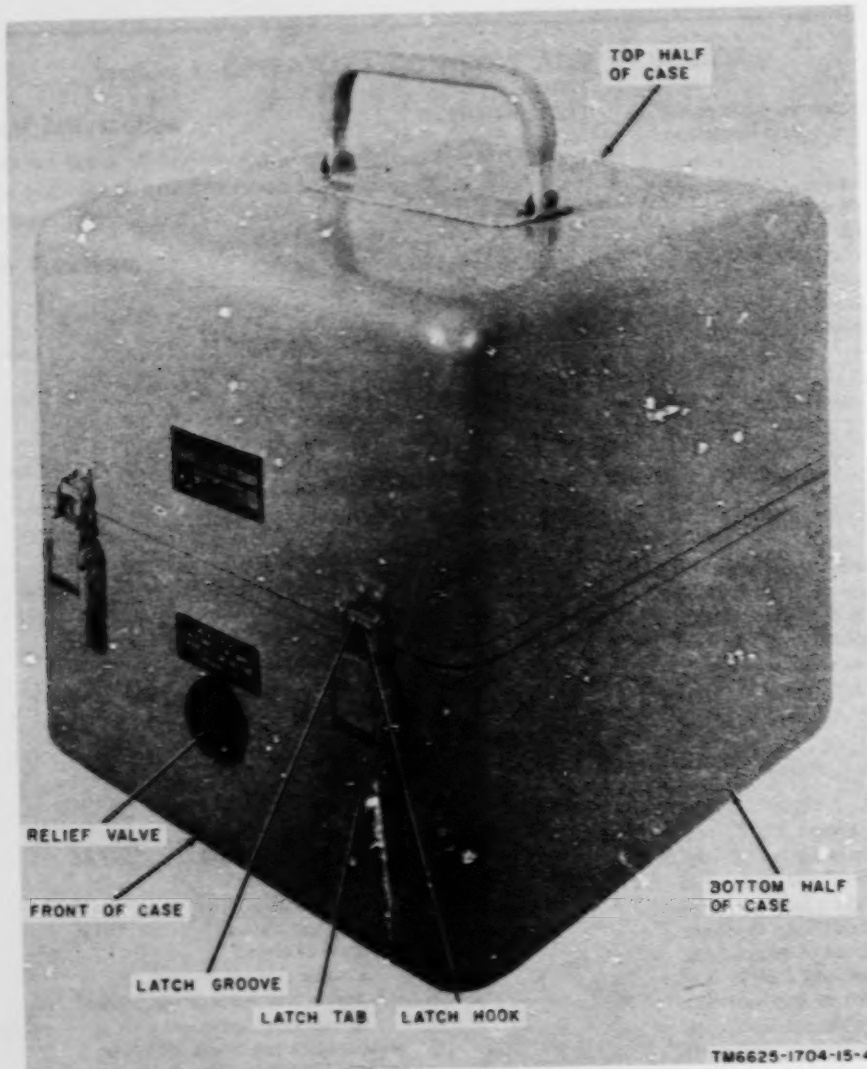
Figure 2-1. Packaging of Electronic System Test Set AN/ASM-338 and accessories.

d. Connect terminal labeled +28V dc to positive terminal of dc power supply.

e. Connect terminal labeled GROUND to a common ground potential.

f. Place ac and dc POWER switches on test panel 570-091-018-1 to OFF.

g. Connect cable assembly to TJ3 on face of test panel 570-091-018-1.



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Figure 2-2. Electronic System Test Set AN/ASM-338, top half of case in place and latched.

CHAPTER 3

OPERATING INSTRUCTIONS

Section I. OPERATOR'S CONTROLS AND INDICATORS

3-1. General Information

The functions of some of the controls and indicators on the test panel are described by telling what they accomplish.

3-2. Switch Functions

(fig. 3-1)

Control or indicator	Function	
	Position	Action
DC power switch..	OFF-----	Test panel deenergized.
	DC-----	Connects test panel to de input power.
AC power switch..	OFF-----	Test panel deenergized.
	AC-----	Connects test panel to 115-V AC input power.
MODE selector switch.	Connects the equipment under test with the necessary power, loads, signals, and monitoring points for a complete function.	
	Position	Action
CP-----	CP-----	Connects test panel circuits to SAS control Panel.
	CP/SAU---	Connects test panel circuits to SAS Control Panel and Sensor Amplifier Unit.
SAU-----	SAU-----	Connects test panel circuits to Sensor Amplifier Unit.
MOD-----	MOD-----	Connects test panel circuits to control channel module.
CHANNEL selector switch.	Isolates the channel under test, inserts the proper signals and power for check out and operates only in the CP, CP/SAU, and SAU mode.	
	Position	Action
PITCH----	PITCH----	Inserts pitch control panel test signals.
ROLL-----	ROLL-----	Inserts roll control panel test signals.
YAW-----	YAW-----	Inserts yaw control panel test signals.

NO-GO TEST switch.

Used only during control panel functional test.

Position	Action
Pressed....	Connects 28 volts to each channel NO-GO light in place of outputs from the built-in test equipment modules.

EMER DISEN-GAGE switch.

Use only during control panel functional test.

Position	Action
Pressed....	Opens circuit between pins P and G, TJ2.

3-3. Potentiometer Function

(fig. 3-1)

FEED BACK SWITCH.

Positions a linear resistance rotary potentiometer to control the amplitude and phase of the feed-back generator in the test set. This test signal source is operational in the CP/SAU, SAU, and MOD modes only.

3-4. Test Point Functions

(fig. 3-1)

Control or indicator	Function	
	Position	Action
TP1 and TP2-----	Allows the actuator coil excitations to be monitored as well as the voltage across a simulated actuator servo coil. The two points can be used to check the overall gain of each channel in the sensor-amplifier unit or the gain of the individual control channel assembly.	
	TP3 and TP4-----	Points at which a function generator can be applied to simulate a pilot's control signal. A control loop frequency response can be obtained with a function generator applied to TP3 and TP4 and a monitoring oscilloscope at TP1.

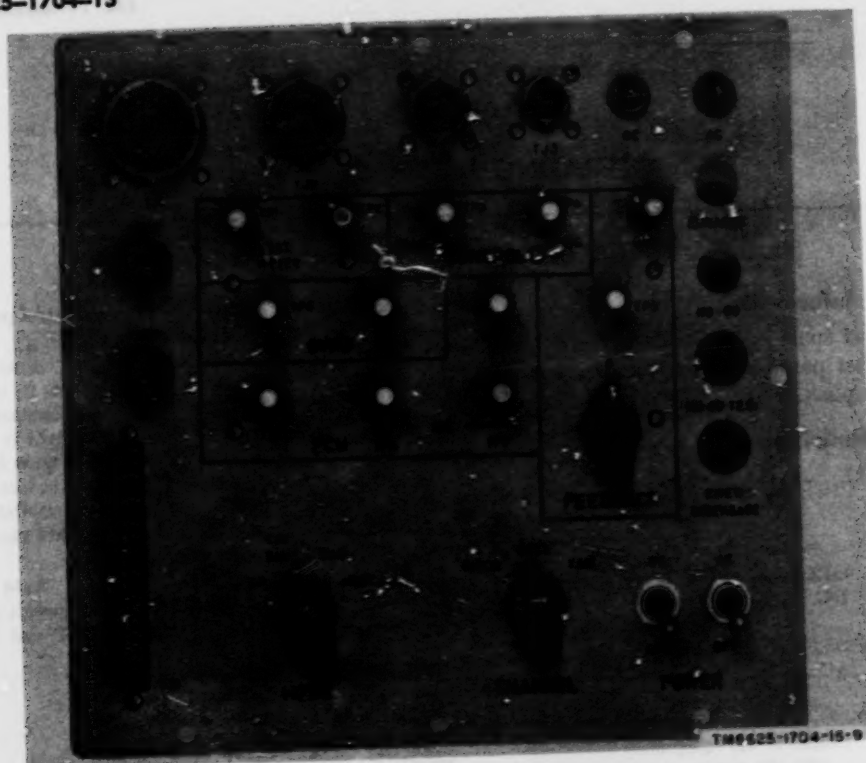


Figure 3-1. Test Panel 570-091-018-1.

- TP5..... Provides measurement of the output of the simulated feedback test signal in the test set prior to its insertion in the sensor-amplifier unit or control channel module.
- TP6..... This test point and a ground terminal allows the test set to provide a low frequency amplitude modulated signal for the control channel module when a function generator is connected at these two points for rate loop frequency responses.
- TP7..... Test point TP7 is the output terminal of the pylon compensator unit and can be used to obtain a frequency response of this particular unit.
- TP8 and TP9..... Provides points at which a function generator can be connected to obtain a frequency response of the pylon compensator unit. A bias is present at TP8 to simulate the mid-range of the pylon motion transducers.
- TP10..... Presents monitor point for the center of the pylon transducer not simulated at TP8.

3-5. Indicator Light Functions (fig. 3-1)

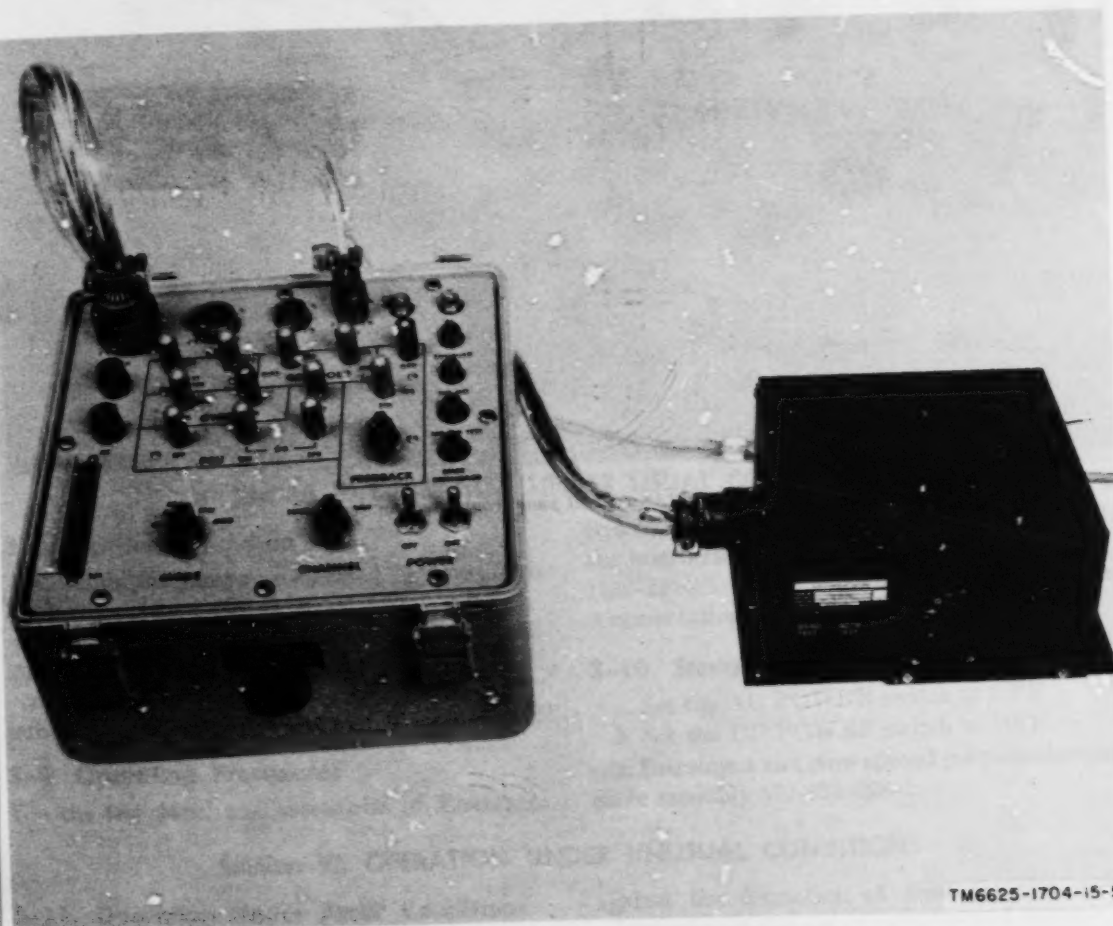
Control or Indicator	Function
AC and DC lights (Amber).	Indicates that power is available to the proper portion of the circuitry. These lights are meaningful only in the CP and SAU modes.
ENGAGED light (Green).	Simulates actuation of hydraulic engage solenoid valve. Illuminates only during CP test and is inserted into the appropriate channel by the channel selector switch.
NO-GO light (Red).	Used in the SAU mode to simulate the control panel NO-GO light. This light is switched to each channel by the channel selector switch and individually checks each control channel NO-GO light voltage. It also provides a light for the control channel module.

3-6. Circuit Protection (fig. 3-1)

Control or indicator	Function
DC fuse.....	Provides overload protection for all DC circuits within and associated with the test unit.
AC fuse.....	Provides overload protection for all AC circuits within and associated with the test unit.

3-7. Connector Functions (fig. 3-1)

Control or indicator	Function
TJ1.....	Provides connection of special purpose electrical cable assembly 570-091-004-1 for test of sensor amplifier unit 570-074-010-3 (fig. 3-2).
TJ2.....	Provides connection of special purpose electrical cable assembly 570-091-027-1 for test of control panel 570-074-060-1 (fig. 3-3).
TJ3.....	Provides connection of special purpose electrical cable assembly 570-091-028-1 for AC and DC power to the MK-1050/ASM (fig. 3-4).
TJ4.....	Provides connection of extender board assembly 570-091-011-1 to facilitate test of control channel assemblies 570-074-037-1, -11, and -15 (fig. 3-4).
TJ5.....	Provides connection of special purpose electrical cable assembly 570-091-026-1 for test of pylon compensation unit 570-074-037-1 (fig. 3-5).



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Figure 3-2. Sensor amplifier connected for test.

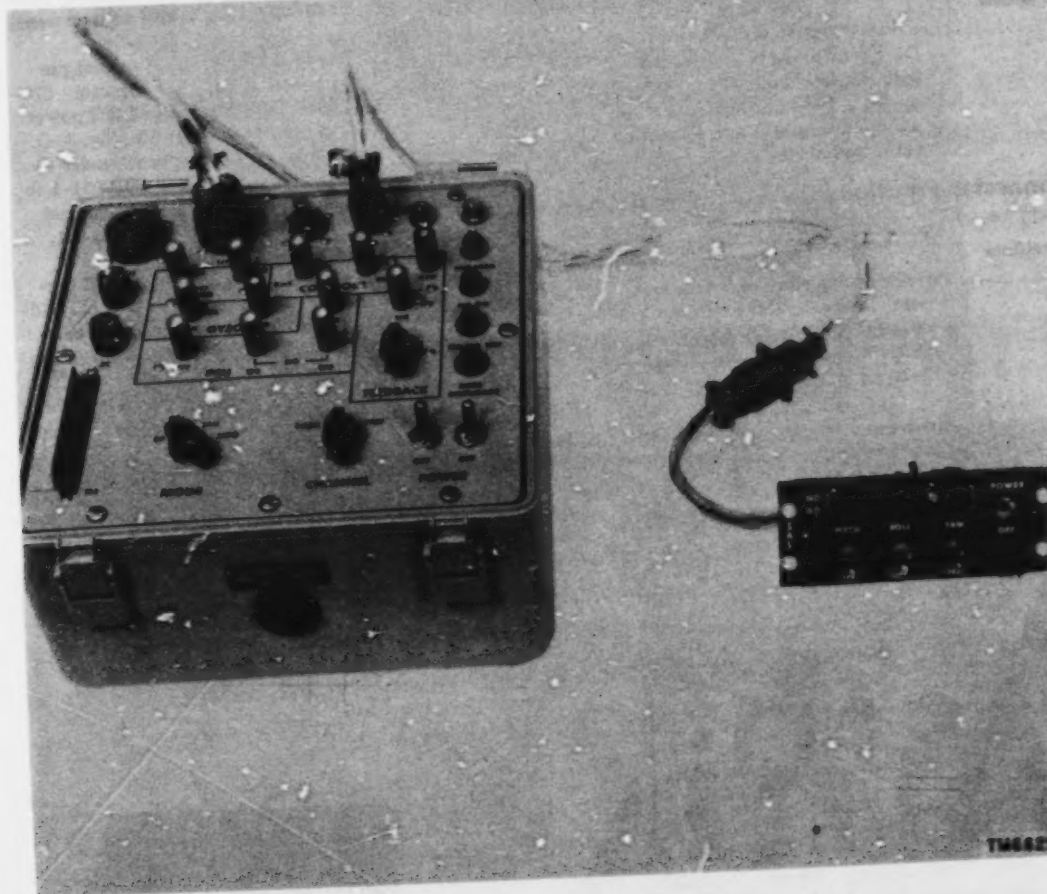


Figure 3-3. SAS control panel connected for test.

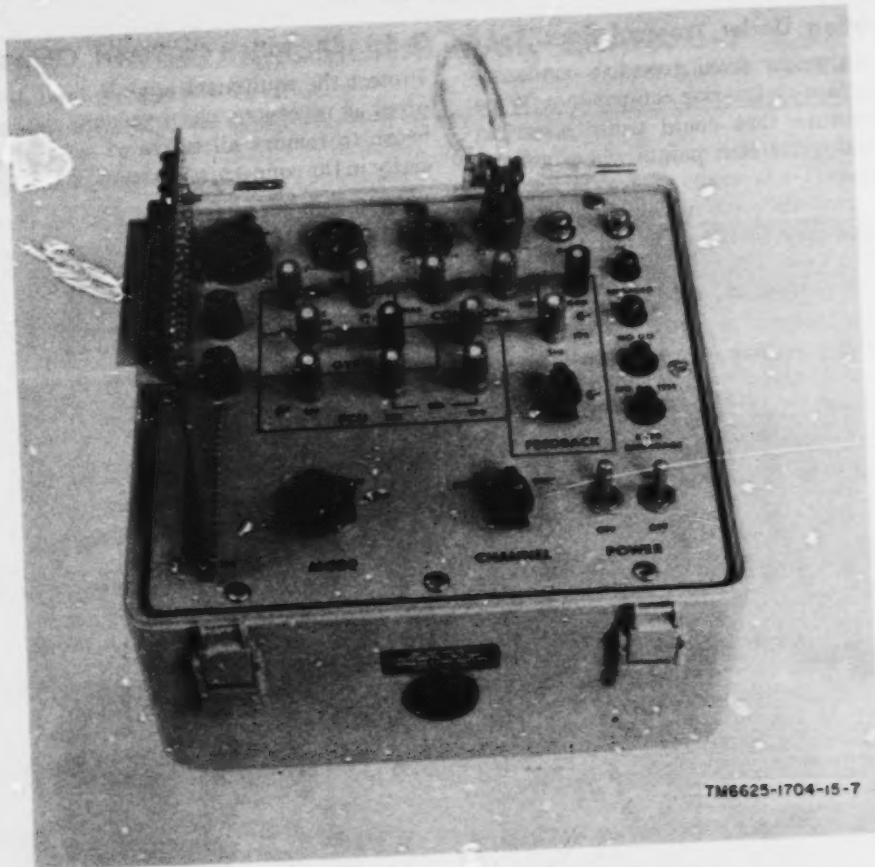


Figure 3-4. Power connected and extender board in place.

Section II. OPERATION UNDER USUAL CONDITIONS

3-8. Starting Procedure

- Accomplish steps as outlined in paragraph 2-4 a through g.
- Set AC Power switch to ON; the amber AC indicator light will illuminate.
- Set DC Power switch to ON; the amber DC indicator light will illuminate.

3-9. Operating Procedures

Use the test panel and accessories of Electronic

System Test Set AN/ASM-338 in accordance with the instructions in the technical manual TM 11-1520-221-35 covering the model 570A Stability Augmentation System.

3-10. Stopping Procedure

- Set the AC POWER switch to OFF.
- Set the DC POWER switch to OFF.
- Disconnect and stow special purpose electrical cable assembly 570-091-028-1.

Section III. OPERATION UNDER UNUSUAL CONDITIONS

3-11. Operation Under Arctic Conditions

Electronic System Test Set AN/ASM-338 is not affected by exposure to arctic temperature conditions. However, the test panel must be protected

against the formation of frost deposits which might prevent the use of switches and controls or obstruct contact openings in the connectors, thereby interfering with their proper mating to the interconnecting cables.

3-12. Operation Under Tropical Conditions

Protect the equipment from excessive condensation on the surface or interior components. Wipe away any moisture that could cause electrical leakage to develop between points where voltage differences exist.

3-13. Operation in Desert Climates

Protect the equipment against sand and dust. As often as necessary, use a vacuum cleaner and soft brush to remove all traces of sand or grit, especially in the connectors and test jacks.

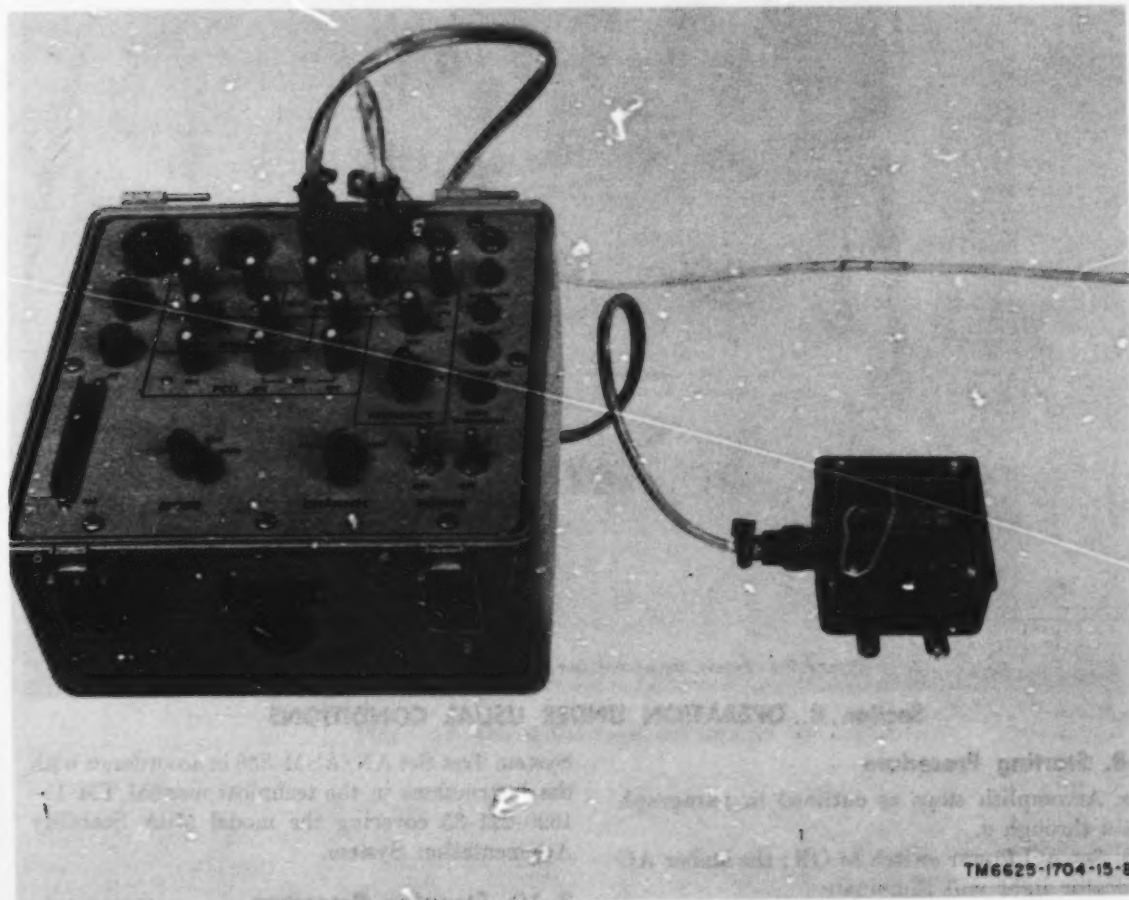


Figure 3-5. Pylon compensation unit connected for test.

CHAPTER 4

ORGANIZATIONAL MAINTENANCE

4-1. Scope of Maintenance

The duties assigned to organizational maintenance for Electronic System Test Set AN/ASM-338 indicated in *a* through *g* below. Also noted are references to the paragraphs covering the specific maintenance function.

- a.* Daily preventive maintenance checks and services (para 4-5).
- b.* Weekly preventive maintenance checks and services (para 4-6).
- c.* Monthly preventive maintenance checks and services (para 4-7).
- d.* Quarterly preventive maintenance checks and services (para 4-8).
- e.* Cleaning (para 4-9).
- f.* Touchup painting (para 4-10).
- g.* Troubleshooting (para 4-13).

4-2. Test Equipment Required

Multimeter AN/USM-223 (or equivalent) and Tool Kit TK-101/G is required for organizational maintenance.

4-3. Preventive Maintenance

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to assure that the equipment is serviceable.

a. Systematic Care. The procedures given in paragraphs 4-5 through 4-10 cover routing systematic care and cleaning essential to proper upkeep and operation of the equipment.

b. Preventive Maintenance Checks and Services. The preventive maintenance checks and services

charts (paras 4-5 through 4-8) outline functions to be performed at specific intervals. These checks and services are to maintain Army electronic equipment in a combat serviceable condition; that is in good general (physical) condition and in good operating condition. To assist in maintaining combat serviceability, the charts indicate what to check, how to check, and what the normal conditions are. The *References* column lists the illustrations, paragraphs, or manuals that contain detailed repair or replacement procedures. If the defect cannot be remedied by performing the corrective actions indicated, higher category maintenance or repair is required. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38-750.

4-4. Preventive Maintenance Checks and Service Periods

Preventive maintenance checks and services of the test set are required daily, weekly, monthly, and quarterly.

a. Paragraph 4-5 specifies checks and services that must be accomplished daily and under the special conditions listed below.

- (1) When the equipment is initially installed.
- (2) When the equipment is reinstalled after removal for any reason.
- (3) At least once each week if the equipment is maintained in standby condition.

b. Paragraphs 4-6, 4-7, and 4-8 specify additional checks and services that must be performed on a weekly, monthly, and quarterly basis, respectively.

4-5, Daily Preventive Maintenance Checks and Services Chart

<i>Sequence No.</i>	<i>Item to be inspected</i>	<i>Procedure</i>	<i>Reference</i>
1	General inspection	Inspect external surfaces for dust, dirt, rust, and corrosion. Clean as required.	Para 4-9.
2	Damage inspection	Inspect exposed components for damage.	Fig. 1-1.
3	Controls	During operation, check action of switches and potentiometers for smooth response without binding, backlash, or looseness. All knobs must be secure.	Fig. 3-1.
4	Preliminary operational	Set power switches to OFF. Connect special purpose electrical cable assembly 570-091-028-1 to power sources.	Para 2-4.
5	INPUT POWER switch	Set to DC ON. Check to see that amber DC ON indicator light lights.	Fig. 3-1; para 4-13.
6	INPUT POWER switch	Set to AC ON. Check to see that amber AC ON indicator light lights.	Para 4-13.

4-6. Weekly Preventive Maintenance Checks and Services Chart

<i>Sequence No.</i>	<i>Item to be inspected</i>	<i>Procedure</i>	<i>Reference</i>
1	Completeness	Check for completeness of equipment.	Para 1-9.
2	Accessories	Inspect cords and cables for cuts, kinks, breaks, crushing, fraying, and improper positioning. Replace, if necessary.	
3	External Items	Inspect external items such as mounting screws, latches, handles, and hinges for looseness, loss, or breakage. Tighten or replace as required.	
4	Metal surfaces	Inspect exposed metal surfaces for rust and corrosion. Clean and touchup paint as required.	Para 4-10.

4-7. Monthly Preventive Maintenance Checks and Services Chart

<i>Sequence No.</i>	<i>Item to be inspected</i>	<i>Procedure</i>	<i>Reference</i>
1	Case and back of test panel.	Remove test panel, clean inside of 570-091-018-1 and back of test panel, and reinstall test panel.	Para 4-9e; fig. 9-1.
2	Top half of case	Clean out accessory kit compartment with brush or vacuum cleaner.	Para 4-9; fig. 9-1.
3	Test cables	Clean connector contacts with brush or vacuum cleaner.	Para 4-9.

4-8. Quarterly Preventive Maintenance Checks and Services Chart

<i>Sequence No.</i>	<i>Item to be inspected</i>	<i>Procedure</i>	<i>Reference</i>
1	Components	Tighten switches, terminal blocks, connectors, indicator lights, and test jacks.	Fig. 3-1.
2	Electrical and mechanical items.	Check electrical items for evidence of overheating and mechanical items for wear and proper operation. Replace parts as required.	Figs. 7-1 and 9-1; para 4-9.
3	Case	Inspect interior of case for dirt, moisture, corrosion, and rust. Clean and touchup paint as required.	Fig. 1-1; paras 4-9 and 9-10.
4	Gasket	Inspect cover gasket for damage. Check to see that it has resilience and proper fit. Replace, if necessary.	Fig. 1-1.
5	Publications	Check to see that all publications are complete, serviceable, and current.	DA Pam 310-4 and DA Pam 310-7.
6	Modification	Check DA Pam 310-7 to determine if new applicable MWO's have been published. All URGENT MWO's must be applied immediately. All NORMAL MWO's must be scheduled.	TM 38-750.
7	Spare parts	Check all spare parts (operator and organizational) for general condition and method of storage. No overstock should be evident, and all shortages must be on valid requisitions.	Para 1-9.

4-9. Cleaning

Examine both the exterior and interior surfaces of the MK-1050/ASM, especially electrical test panel 570-091-018-1. Surfaces should be clean and free from dust and other dirt, grease, and fungus.

a. Remove loose dirt with a clean, soft cloth, or, where access is restricted, a shop vacuum cleaner with a soft, brush-type nozzle.

b. Remove dirt from plugs and jacks, using either a brush or vacuum cleaner.

Warning: Prolonged breathing of cleaning compound is dangerous; make certain that adequate ventilation is provided. Cleaning compound is flammable; do not use near a flame. Avoid contact with the skin; wash off any that spills on your hands.

c. Remove grease, fungus, or ground-in dirt with a cloth dampened (not wet) with cleaning compound (FSN 7930-395-9542).

d. Effective cleaning can be accomplished by using a soft, clean cloth dampened (not saturated) with a solution of mild soap and water. Care must be taken to prevent the entry of moisture into connector contact openings or any other openings in the test panel.

e. To gain access for cleaning the interior of the case, remove the 8 machine screws and washers (fig. 9-1) located along the edges of the test panel; then carefully lift the panel out of the case.

f. The indicator lamps (fig. 3-1) and their associated lenses are integral. To remove these lamp elements for inspection or replacement, grasp the

knurled edge with the fingers and rotate them counterclockwise to unscrew the assembly.

4-10. Touchup Painting

Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of enamel on the bare metal to protect it from further corrosion. Refer to applicable cleaning and refinishing practices specified in TB SIG 364 and TM 9-213.

4-11. Lubrication

No lubrication is required.

4-12. General Troubleshooting Information

Troubleshooting this equipment is based upon the operational check contained in the daily preventive maintenance checks and services chart. To troubleshoot the equipment, perform all functions starting with item number 4 in the daily preventive maintenance checks and services chart (para 4-5). When an abnormal condition or result is observed, perform the checks and corrective measures indicated in the troubleshooting chart (para 4-13). If the corrective measures indicated do not result in correction of the trouble, higher category of maintenance is required.

4-13. Troubleshooting Chart

Set DC POWER switch to ON, MODE selector switch to SAU or MOD, AC POWER switch to ON and perform checks for operating power (ac and dc) as indicated in chart below.

Item No.	Trouble symptom	Probable trouble	Checks and corrective measures
1	Amber DC ON indicator light does not light when operating from power supply source.	a. DC power supply not delivering current to equipment.	a. Check DC fuse and power cable connections.
		b. Indicator light defective.	b. Replace indicator light DS4.
2	Amber AC on indicator light does not light when operating from power supply source.	a. AC power supply not delivering current to equipment.	a. Check DC fuse and power cable connections.
		b. Indicator light defective.	b. Replace indicator light DS3.

CHAPTER 5

FUNCTIONING

5-1. General

Test panel 570-091-018-1 consists of 3 individual and independent circuits (fig. 9-8) in a compact and integrated assembly for testing the model 570A Stability Augmentation System components. It provides all necessary loads, signals, and inner-connections for testing removed components of the 570A Stability Augmentation System (SAS). Test jacks provide access to circuit test points; connectors and test cables provide coupling to the SAS set components undergoing test.

5-2. INPUT POWER Circuit

The input power required to energize the equipment is 28 volts dc at 5 amperes and 115 volts ac, 400 Hz, at 50 va.

5-3. 28 VDC INPUT POWER

(fig. 9-8)

The AN/ASM-338 test set receives 28 volts dc from an external supply through pin D of TJ3, through protective fuse F1 (1 amp), and through DC POWER switch SW1.

a. From SW1 dc power is distributed to pins B and U of TJ2, to terminal C1 Deck 3 of SW3, to pin 2 of 570-091-007-1 printed circuit assembly, to pins D and S of TJ4, to pin D of TJ5, and to pin 32 of 570-091-029-1 pylon compensator unit test circuit. From pin 2 of the 570-091-007-1 printed circuit assembly, the 28 volts dc is further distributed through R15 to CR8 and through R7 to CR7. From pin 32 of 570-091-029-1 Pylon Comp Unit test circuit, the dc power is distributed through R25 to CR12.

b. With SW3 in position 1, dc power is distributed from terminal C1 Deck 3 of SW3 through SW4 and through CR1, CR2, and CR3 to pins R, D, and F of TJ2; to n, d, and P of TJ1; and through SW6 terminal C3 Deck 3 and CR5 to DS2.

c. With SW3 in positions 3 and 4, dc power is distributed to pin N of TJ2, pin h of TJ1, and DS4.

5-4. 115 VAC INPUT Power

(fig. 9-8)

The AN/ASM-338 test set receives 115 volts ac from an external supply through pin A of TJ3, through F2 (1 amp), and through SW2.

a. From SW2, the 115 volts ac is applied to pin T of TJ2 to terminal C2 Deck 3 of SW3, to pins 1 and 8 of 570-091-007-1 printed circuit assembly, and to pin 1 of T2.

b. With SW3 in positions 3 and 4, 115 volts ac is applied to pin V of TJ2, pin R of TJ5, and DS3 through R1.

5-5. Regulated DC Voltage

(fig. 9-8)

a. A regulated 20 volts dc is furnished by CR7 and is applied to R20, R21, R22, R23, and pin 12 Deck 2 of SW3.

b. With SW3 in position 4, 20 volts dc is applied to CR6 which works in conjunction with R2, R3 and R5 to simulate a control motion voltage of 17.5 volts unloaded.

5-6. Pulse Generation

(fig. 9-8)

The associated circuitry of Q2, Q3, and Q4 form a pulse generation network for use in the checkout of the control channel assembly. The 115 volt ac 400 Hz voltage at pin 8 of 570-091-007-1 printed circuit assembly is changed into a positive square wave by R19 and CR9. The square wave is then differentiated by C5 and R20 forming sharp positive and negative pulses. CR10 and CR11 merely protect the reverse emitter-base break down of Q2 and Q3. The negative pulse formed by the differentiating circuit brings the normally saturated Q2 into the cutoff region of its operation. Q2 stays OFF for a short time and then returns to saturation. The new pulse formed by the operation of Q2 is now differentiated by C6 and R22 combination. Q3 operates the same as Q2 producing a final output positive pulse which is short in rela-

tion to a 400 Hz period and is in synchronism with the input 115 volts ac except delayed in time. R21 and R23 serve as the collector resistors for Q2 and Q3 respectively. Resistor R24 and transistor Q4 function as a phase inversion stage to produce a negatively going pulse. Regulated 20 volts dc is used for collector bias of Q2 and Q3.

5-7. Actuator Position Feedback Signal

(fig. 9-8)

Items T1, C1, R8 and R6 form an actuator position feedback network which generates a 400 Hz signal whose magnitude and phase varies with the position of R8. In all but the control channel mode, T1 is excited by 26 volts ac from the sensor amplifier unit under test. For the control channel mode, transformer T2 provides 26 volts ac for excitation of T1.

5-8. Low Frequency Modulation

(fig. 9-8)

A1 is a magnetic modulator which, in this case, is used as a low frequency modulator producing a 400-Hz signal output which can be externally modulated by a function generator.

a. The modulation frequency range of interest for the 570A SAS system is from 0.01 to 10 Hz. R9, R10, R14, R15, and CR8 form the dc and ac biasing circuitry for the magnetic modulator A1.

R11, R12, and R13 provide the modulation signal input attenuation network.

b. Pins 5 and 6 of A1 provide the modulated 400 Hz output wave. Isolation is provided by emitter follower Q1 before the gyro signal is applied through transformer T3 to pins L and P of TJ4.

5-9. Pylon Oscillation Compensation Signal

(fig. 9-8)

The 570-091-029-1 pylon compensator unit test circuit provides a simulated pylon compensator for checking the roll channel in the control channel mode.

a. For the functional test of the control channel assembly, Q5, R26, R27, R28, R29, and C8 form the network to reflect the impedance at pin N of TJ4 which would be experienced if a complete pylon compensator was operating in conjunction with the roll channel SAS.

b. Items Q6, R30, R31, R32, R33, and C7 form the network to reflect the impedance at pin K of TJ5 which would be experienced if a complete pylon compensator was operating in conjunction with the sensor amplifier unit.

c. Items R34 and R35 simulate the forward pylon potentiometer and R36 and R37 simulate the aft pylon potentiometer in the functional test of the 570-074-131-1 pylon compensator unit.

CHAPTER 6

TROUBLESHOOTING

Section I. GENERAL TROUBLESHOOTING INFORMATION

Warning: High voltages are present in the AN/ASM-338 and safety precautions should be observed. Potentials of 115 volts appear at pin A of TJ3, F2, SW3, pin T of TJ2, terminal C2 deck 3 of SW3, pin 1 and 8 of 570-091-007-1 printed circuit assembly, and pin 1 of T2.

6-1. General Instructions

Troubleshooting at general support includes all the techniques outlined for organizational maintenance, and any special or additional techniques required to isolate a defective part and effect restoration of the equipment to service. Paragraphs 6-4 through 6-8 present the individual circuit units that comprise the AN/ASM-338 and the troubleshooting procedures applicable to each circuit unit. Where circuit or functional interrelationships are involved, the techniques for localizing and isolating faults are described.

6-2. Organization of Troubleshooting Procedures

a. General. The initial requirement for a logical service procedure is localization of the faulty area of operation. This may be determined by the nature and area of the deficiency or abnormality. Once this is established, the next step is to isolate or locate the specific cause of the abnormality. This may be a defective component or the result of some mechanical failure. Primarily, isolation of a fault will require voltage or resistance readout. The normal operational use of the AN/ASM-338 will, in a large measure, indicate the location and probable nature of the defect.

b. Localization. Electronic System Test Set AN/ASM-338 consists of an array of test circuits in addition to power sources for energizing the circuits with the various voltage levels required. It also provides an accessory kit containing cables and couplings for inter-connecting the individual AN/ASM-338 test circuits with the corresponding circuits of the 570A SAS System. Each test circuit is an independent unit; therefore, localization of faults will be self-evident during operational use

of the equipment or in the course of sequential maintenance checkout procedures.

c. Isolation. Reference to paragraphs 6-4 through 6-8 and the associated troubleshooting charts will indicate the specific waveforms, voltage, or resistance readings that should be obtainable at significant points. Deviations from the normal will define the component or other circuit element causing any malfunction. Frequently, visual inspection will disclose a source of trouble either because of thermal discoloration or mechanical abnormality.

d. Resistance Measurements. Although transistorized circuits are utilized for power supply purposes, these circuits are de-isolated from all other circuits wherein ohmmeter measurements would be applicable. Therefore, no special precautions are required in the use of the ohmmeter with respect to polarity or range unless expressly stated.

e. Voltage Measurements. Unless otherwise indicated by directions for a specific measurement, voltage readings may be taken by use of a multimeter, using any appropriate range.

f. Waveforms. Waveform comparison between patterns obtained at indicated test points and reference patterns will materially aid in the analysis of malfunction in those circuits where waveform is of major significance.

g. Test Points. Panel-mounted test jacks connect to significant circuit points in each block area of the equipment. Connection of test instrumentation to these test points will facilitate troubleshooting without needless disassembly of the equipment. The schematic diagram (fig. 9-8) shows the circuit location of each test point, and figure 3-1 depicts their physical distribution and location.

h. Intermittent Troubles. Trouble of an intermittent nature is occasionally encountered. In en-

deavoring to isolate the cause, it is generally necessary to induce the condition by tapping, jarring, or probing the equipment. A cold-soldered or rosined connection may be the cause. Likewise, a fractured wire or printed circuit board may be responsible. Visual examination with the aid of magnification may be of assistance in locating the defect.

i. *Resistor, Capacitor, and Diode Color Code Diagrams.* Color Code diagrams for resistors, ca-

pacitors, and diodes provide pertinent resistance, voltage, rating, and tolerance information (figs. 9-2 and 9-3).

6-3. Test Equipment Required

The following chart lists test equipment required for troubleshooting Electronic System Test Set AN/ASM-338. The associated figure references are also listed.

Commercial test equipment	Equivalent Army test equipment	Figure reference
Multimeter, Simpson model 260.....	Multimeter AN/USM-223.....	Fig. 9-4
Multimeter, Hewlett-Packard model 400H.....	Voltmeter, Electronic ME-30E/U.....	Fig. 9-5
Oscilloscope, Hewlett-Packard model 130C.....	Oscilloscope AN/USM-140.....	Fig. 9-6
Function Generator, Hewlett-Packard model 202A.....	Generator, Signal SG-321/U.....	Fig. 9-7

Section II. TROUBLESHOOTING ELECTRICAL TEST PANEL 570-091-018-1

Note 1. Short circuit protection is afforded by fuses in the power circuits. An open fuse is evidence of either a short circuit or an excessive current demand in the associated circuit. If such a condition develops, immediate investigation is required. Fuse burn-out protective response initiated by a malfunction in the test facilities kit must be divorced from the reaction induced by a shorted SAS unit in the course of service operations. To segregate externally caused fuse burn-out reaction from an internal caused burn-out, disconnect the interconnecting cable from the test facilities kit. If the trouble persists, corrective measures are called for in the MK-1060/ASM. The following chart indicates the block areas controlled by each circuit breaker:

Fuse	Section
AC PWR F2.....	Ac operation portion.
DC PWR F1.....	Dc operation portion.

Note 2. To a great extent, service analysis can be effected through the use of the panel-mounted test jacks and connectors without removing the panel from its case. However, some internal measurements may be required or repairs necessitated. To gain access to the interior of the instrument, remove the 8 machine screws from around the edge of the panel. Grasp the panel and gently lift the panel from the case. For internal component location refer to figures 7-1 through 7-5.

Caution: Several high voltage points are easily accessible with the rear of the panel exposed. Use every precaution to avoid the hazard of a severe shock.

6-4. Checking Control Panel Mode Circuitry (fig. 9-8)

Symptoms, causes, and corrective measures are given in the chart below. Unless otherwise specified the MODE selector switch is to remain in CP

position and the FEEDBACK knob at 0 during all trouble shooting procedures in this paragraph. Return all power switches to OFF and remove all jumpers after each symptom check.

Symptom	Probable trouble	Correction
1. CHANNEL selector switch to PITCH, AC POWER switch OFF, DC POWER switch ON; no 28-volt dc reading present at pin U or pin B of TJ2.	a. Defective DC fuse (F1) b. Defective DC POWER switch (SW1)	a. Replace fuse. b. Replace switch.
2. CHANNEL selector switch to PITCH, AC POWER switch OFF, DC POWER switch ON, NO GO test switch pressed; no 28-volt dc reading present at pin R, D or F of TJ2.	a. Defective diode (CR1) (CR2) or (CR3). b. Defective NO GO test switch (SW4). c. Defective MODE switch (SW3).	a. Replace diode. b. Replace switch. c. Clean or replace switch as necessary.

Symptom	Probable trouble	Correction
3. CHANNEL selector switch to PITCH, AC POWER switch OFF, pins B and S of TJ2 jumpered, pins G and a of TJ2 jumpered, DC POWER switch ON; green ENGAGED light fails to illuminate.	a. Defective ENGAGED light (DS1).. b. Defective CHANNEL selector switch (SW6).	a. Replace light. b. Clean or replace switch as necessary.
4. CHANNEL selector switch set to ROLL, AC POWER switch OFF, pins E and D of TJ2 jumpered, pins b and G of TJ2 jumpered, DC POWER switch ON; green ENGAGED light fails to illuminate.	a. Defective ENGAGED light (DS1).. b. Defective CHANNEL selector switch (SW6).	a. Replace light. b. Clean or replace switch as necessary.
5. CHANNEL selector switch at YAW, AC POWER switch OFF, pins B and C of TJ2 jumpered, pins c and G of TJ2 jumpered, and DC POWER switch to ON, green ENGAGED light does not illuminate.	a. Defective ENGAGED light (DS1)..... b. Defective CHANNEL selector switch (SW6)---	a. Replace light. b. Clean or replace switch as necessary.
6. CHANNEL selector switch to YAW, AC and DC POWER switch OFF, EMER DISENGAGE switch depressed; continuity is present between pin P of TJ2 and GND.	a. Defective EMER DISENGAGE switch (SW5) ..	a. Replace switch.
7. CHANNEL selector switch to YAW, pins B and M of TJ2 jumpered, AC and DC POWER switches ON, DC indicator light fails to illuminate.	a. Defective DC indicator light (DS4)..... b. Defective AC POWER switch (SW2)..... c. Defective MODE switch (SW3).....	a. Replace light. b. Replace switch. c. Clean or replace switch as necessary.
8. CHANNEL SELECTOR switch to YAW, pins B and N of TJ2 jumpered, AC POWER switch OFF, DC POWER switch ON, DC indicator light fails to illuminate.	a. Defective DC indicator light (DS4) .. b. Defective AC POWER switch (SW2). c. Defective MODE switch (SW3) ----	a. Replace light. b. Replace switch. c. Clean or replace switch as necessary.
9. CHANNEL selector switch to YAW, DC POWER switch to OFF, AC POWER switch to ON, no 115-volt ac reading at pin T of TJ2.	a. Defective AC fuse (F2)..... b. Defective AC POWER switch (SW2).	a. Replace fuse. b. Replace switch.
10. CHANNEL selector switch to YAW, pins T and V of TJ2 jumpered, DC POWER switch to OFF, AC POWER switch to ON, AC indicator light fails to illuminate.	a. Defective AC indicator (DS3)..... b. Defective AC POWER switch (SW2). c. Defective resistor (R1).....	a. Replace light. b. Replace switch. c. Check for correct resistance and replace if necessary.

6-5. Checking Sensor Amplifier Unit Mode Circuitry.

(fig. 9-8)

Symptoms, causes, and corrective measures are given in chart form below. Unless otherwise specified the MODE selector switch is to remain in SAU position and the FEEDBACK knob at 0 during all troubleshooting procedures in this paragraph. Return all power switches to OFF and remove all jumpers after each symptom check.

Symptom	Probable trouble	Correction
1. CHANNEL selector switch set to PITCH, AC POWER switch OFF, DC POWER switch ON; amber DC indicator light fails to illuminate and no 27.5-volt dc reading present at pin h of TJ1.	a. Defective DC fuse (F1)----- b. Defective DC indicator light (DS4)----- c. Defective MODE selector switch (SW3).----- d. Defective wiring.-----	a. Replace fuse. b. Replace light. c. Clean or replace switch as necessary. d. Check and repair wiring as necessary.
2. CHANNEL selector switch set to PITCH, pins n and h of TJ1 jumpered, AC POWER switch OFF, DC POWER switch ON; NO GO indicator light fails to illuminate and no 27.5 $\pm$ 2volt dc reading present at pin R of TJ2.	a. Defective NO GO indicator light (DS2).----- b. Defective diode (CR5)----- c. Defective CHANNEL selector switch (SW6).-----	a. Replace light. b. Replace diode. c. Clean or replace switch as necessary.
3. CHANNEL selector switch set to PITCH, pins k and V of TJ1 jumpered, pins h and a of TJ1 jumpered, AC POWER switch OFF, DC POWER switch ON, a function generator adjusted for an output of 1 Hz with a sine wave of 10-volt peak-to-peak connected between TP3 and TP4; (do not ground TP3 and TP4); no voltage reading of 17.5 volts dc at TP3, TP4, and pin p of TJ1, also no 0.3-volt peak-to-peak reading at pin p of TJ1.	a. Defective diode (CR6)----- b. Defective resistor (R3)----- c. Defective resistor (R5)----- d. Defective CHANNEL selector switch (SW6).----- e. Defective MODE selector switch (SW3).----- f. Defective resistor (R2)-----	a. Replace diode. b. Replace resistor. c. Replace resistor. d. Clean or replace switch as necessary. e. Clean or replace switch as necessary. f. Replace resistor.
4. CHANNEL selector switch set to PITCH, AC POWER switch ON, DC POWER switch OFF; no 115 volt rms measurement at pin R of TJ1.	a. Defective AC fuse (F2)----- b. Defective AC POWER switch (SW2).----- c. Defective CHANNEL selector switch (SW6).-----	a. Replace fuse. b. Replace switch. c. Clean or replace switch as necessary.
5. CHANNEL selector switch set to PITCH, pins R and C of TJ1 jumpered through a 4.7K ohms 1 watt resistor, pins S and B of TJ1 jumpered, pins X and W of TJ1 jumpered, DC POWER switch, OFF, AC POWER switch ON; AC voltage reading at TP5 or pin Z of TJ1 does not increase to approximately 9.5 volts rms as FEED-BACK knob is rotated clockwise or counter-clockwise from zero.	a. Defective capacitor (C1)----- b. Defective resistor (R6)----- c. Defective resistor (R8)----- d. Defective MODE selector switch (SW3).----- e. Defective CHANNEL selector switch (SW6).----- f. Defective transformer (T1)-----	a. Replace capacitor. b. Replace resistor. c. Replace resistor. d. Clean or replace switch as necessary. e. Clean or replace switch as necessary. f. Replace transformer.
6. CHANNEL selector switch set to PITCH, AC POWER switch OFF, DC POWER switch OFF; no resistance reading of 2K ohms $\pm$ 5% present between pins q and f of TJ1.	Defective resistor (R4)-----	Replace resistor.

Symptom	Probable trouble	Correction
7. CHANNEL selector switch set to ROLL, AC POWER switch OFF, DC POWER switch ON; amber DC indicator light fails to illuminate.	a. Defective DC fuse (F1).....	a. Replace fuse.
	b. Defective DC indicator light (DS4).....	b. Replace light.
	c. Defective DC POWER switch (SW1).....	c. Replace switch.
8. CHANNEL selector switch set to ROLL, pins h and d of TJ1 jumpered, AC POWER switch OFF, DC POWER switch ON, NO GO indicator light fails to illuminate and no 27.5 $\pm$ 2 volts dc reading is present at pin D of TJ2.	a. Defective NO GO indicator light (DS2).....	a. Replace light.
	b. Defective diode (CR5).....	b. Replace diode.
	c. Defective CHANNEL selector switch (SW6).....	c. Clean or replace switch as necessary.
9. CHANNEL selector switch set to ROLL, pins m and V of TJ1 jumpered, pins n and r of TJ1 jumpered, AC POWER switch OFF, DC POWER switch ON, a function generator adjusted for an output of 1 Hz with a sine wave of 10-volt peak-to-peak connected between TP3 and TP4 (do not ground TP3 or TP4); no voltage reading of 17.5 volts dc present at TP3, TP4, and pin c of TJ1, also no 0.3-volt peak-to-peak reading at pin C of TJ1.	a. Defective diode (CR6).....	a. Replace diode.
	b. Defective resistor (R3).....	b. Replace resistor.
	c. Defective resistor.....	c. Replace resistor.
	d. Defective CHANNEL selector switch (SW6).....	d. Clean or replace switch as necessary.
	e. Defective MODE selector switch (SW3).....	e. Clean or replace switch as necessary.
	f. Defective resistor (R2).....	f. Replace resistor.
10. CHANNEL selector switch set to ROLL, pin R and B of TJ1 jumpered through a 4.7K-ohm 1-watt resistor, pins T and V of TJ1 jumpered, pins i and W of TJ1 jumpered, DC POWER switch OFF, AC POWER switch ON; AC indicator light fails to illuminate.	a. Defective AC indicator light (DS3).....	a. Replace light.
	b. Defective AC fuse (F2).....	b. Replace fuse.
	c. Defective resistor (R1).....	c. Replace resistor.
	d. Defective AC POWER switch (SW2).....	d. Replace switch.
	e. Defective MODE selector switch (SW3).....	e. Clean or replace switch as necessary.
11. CHANNEL selector switch set to ROLL, pins R and B of TJ1 jumpered through a 4.7K-ohm 1-watt resistor, pins T and V of TJ1 jumpered, pins i and W of TJ1 jumpered, DC POWER switch OFF, AC POWER switch ON; no voltage reading of 9.5 volts rms present at TP5 or pin D of TJ1 when FEEDBACK knob is rotated either clockwise or counterclockwise from 0.	a. Defective capacitor (C1).....	a. Replace capacitor.
	b. Defective resistor (R6).....	b. Replace resistor.
	c. Defective resistor (R8).....	c. Replace resistor.
	d. Defective MODE selector switch (SW3).....	d. Clean or replace switch as necessary.
	e. Defective CHANNEL selector switch (SW6).....	e. Clean or replace switch as necessary.
	f. Defective transformer (T1).....	f. Replace transformer.
12. CHANNEL selector switch set to ROLL, DC POWER switch OFF, AC POWER switch OFF; no resistance reading of 2K ohms plus or minus 5 percent between pins e and b of TJ1.	Defective resistor (R4).....	Replace resistor.
13. CHANNEL selector switch set to YAW, AC POWER switch to OFF, DC POWER switch ON, amber DC indicator light fails to illuminate.	a. Defective DC fuse (F1).....	a. Replace fuse.
	b. Defective DC indicator light (DS4).....	b. Replace light.
	c. Defective MODE selector switch (SW3).....	c. Clean or replace switch as necessary.

Symptom	Probable trouble	Correction
14. CHANNEL selector switch set to YAW, pin k and P of TJ1 jumpered, AC POWER switch OFF, DC POWER switch ON; NO GO indicator light fails to illuminate and no 27.5 ± 2 volts dc reading present at pin F of TJ2.	a. Defective NO GO indicator light (DS2). b. Defective diode (CR5)----- c. Defective CHANNEL selector switch (SW6).	a. Replace light. b. Replace diode. c. Clean or replace switch as necessary.
15. CHANNEL selector switch set to YAW, AC POWER switch OFF, pin s and V of TJ1 jumpered, pin h and t of TJ1 jumpered, DC POWER switch ON, function generator adjusted for an output of 1 Hz with a sine wave of 10V peak to peak connected between TP3 and TP4 (do not ground TP3 or TP4); no voltage reading of 17.5 volts dc at TP3, TP4, and pin N of TJ1, also no 0.3-volt peak-to-peak reading at pin N of TJ1.	a. Defective diode (CR6)----- b. Defective resistor (R3)----- c. Defective CHANNEL selector switch (SW6). d. Defective MODE selector switch (SW3). e. Defective resistor (R2)-----	a. Replace diode. b. Replace resistor. c. Clean or replace switch as necessary. d. Clean or replace switch as necessary. e. Replace resistor.
16. CHANNEL selector switch set to YAW, pins j and W of TJ1 jumpered through a 4.7K-ohm 1-watt resistor, pins R and Y of TJ1 jumpered, AC POWER switch ON, DC POWER switch OFF; AC indicator light fails to illuminate.	a. Defective AC indicator light (DS3). b. Defective AC fuse (F2)----- c. Defective resistor (R1)----- d. Defective AC POWER switch (SW2). e. Defective MODE selector switch (SW3).	a. Replace light. b. Replace fuse. c. Replace resistor. d. Replace switch. e. Clean or replace switch as necessary.
17. CHANNEL selector switch set to YAW, pins j and W of TJ1 jumpered through a 4.7K 1-watt resistor, pins R and Y of TJ1 jumpered, AC POWER switch ON, DC POWER switch OFF; no voltage reading of 9.5 volts rms present at TP5 or pin E of TJ1 when FEEDBACK knob is rotated either clockwise or counterclockwise from 0.	a. Defective capacitor (C1)----- b. Defective resistor (R6)----- c. Defective resistor (R8)----- d. Defective MODE selector switch (SW3). e. Defective CHANNEL selector switch (SW6). f. Defective transformer (T1)-----	a. Replace capacitor. b. Replace resistor. c. Replace resistor. d. Clean or replace switch as necessary. e. Clean or replace switch as necessary. f. Replace transformer.
18. CHANNEL selector switch set to YAW, AC POWER switch OFF, DC POWER switch OFF; no resistance reading of 2K ohm $\pm 5\%$ between pins L and M of TJ1.	Defective resistor (R4)-----	Replace resistor.
19. CHANNEL selector switch set to YAW, AC POWER switch ON, DC POWER switch ON, function generator set for output of 10V peak to peak and sine wave of 400 Hz with high side to GND; no reading of approximately 2.75 volts at 400 Hz present at pin K of TJ1.	a. Defective capacitor (C7)----- b. Defective transistor (Q5)----- c. Defective resistor (R30)----- d. Defective resistor (R31)----- e. Defective resistor (R32)----- f. Defective resistor (R33)----- g. Defective resistor (R25)----- h. Defective diode (CR12)-----	a. Replace capacitor. b. Replace transistor. c. Replace resistor. d. Replace resistor. e. Replace resistor. f. Replace resistor. g. Replace resistor. h. Replace resistor.

6-6. Checking Control Panel/Sensor Amplifier Mode Circuitry.

(fig. 9-8)

Symptoms, causes, and corrective measures are given in chart form below. Unless otherwise specified the MODE selector switch is to remain in CP/SAU position and the FEEDBACK knob at 0 during all troubleshooting procedures in this paragraph. Return all power switches to OFF and remove all jumpers after each symptom check.

Symptom	Probable trouble	Correction
1. CHANNEL selector switch to PITCH, AC and DC POWER switch OFF. With EMER DISENGAGE switch depressed, continuity present from pin P of TJ2 to GRD. No continuity from pin N of TJ2 to h of TJ1.	Defective EMER DISENGAGE switch (SW5).	Replace switch.
2. CHANNEL selector switch to PITCH, AC POWER switch OFF, DC POWER switch ON; NO reading of 27.5 ± 2 volts dc from pins B and U of TJ2 to GRD.	a. Defective DC fuse (F1)----- b. Defective DC POWER switch (SW1).	a. Replace fuse. b. Replace switch.
3. CHANNEL selector switch to PITCH, pin n of TJ1 and pin D of TJ2 jumpered, AC POWER switch OFF, DC POWER switch ON; NO reading of 27.5 ± 2 volts DC from R of TJ2 to GRD. Also NO GO indicator light fails to illuminate.	a. Defective NO GO indicator light (DS2). b. Defective diode (CR5)----- c. Defective CHANNEL selector switch (SW6).	a. Replace light. b. Replace diode. c. Clean or replace switch as necessary.
4. CHANNEL selector switch to PITCH, pins B and 8 of TJ2 jumpered, pins B and a of TJ2 jumpered, AC POWER switch OFF DC POWER switch ON; green ENGAGED light fails to illuminate.	a. Defective ENGAGED light (DS1).. b. Defective CHANNEL selector switch (SW5).	a. Replace light. b. Clean or replace switch as necessary.
5. CHANNEL selector switch to PITCH, pins k and B of TJ1 jumpered, pins B of TJ2 jumpered to pin a of TJ1, a function generator adjusted for an output of 1 Hz with a sine wave of 10 volts peak to peak connected between TP3 and TP4 (do not ground TP3 or TP4), DC POWER switch ON, AC POWER switch ON; no voltage reading of 17.5 volts dc present at TP3, TP4, and pin p of TJ1; also no 0.3-volt peak-to-peak reading at pin p of TJ1.	a. Defective diode (CR6)----- b. Defective resistor (R3)----- c. Defective resistor (R5)----- d. Defective CHANNEL selector switch (SW6). e. Defective MODE selector switch (SW3). f. Defective resistor (R2)-----	a. Replace diode. b. Replace resistor. c. Replace resistor. d. Clean or replace switch as necessary. e. Clean or replace switch as necessary. f. Replace resistor.
6. CHANNEL selector switch to PITCH, DC POWER switch OFF, AC POWER switch ON; voltage reading of 115 volts ac not present at T of TJ2.	a. Defective AC fuse (F2)----- b. Defective AC POWER switch (SW2).	a. Replace fuse. b. Replace switch.

Symptom	Probable trouble	Correction
7. CHANNEL selector switch to PITCH, pins P and V of TJ2 jumpered, DC POWER switch OFF, AC POWER switch ON; AC indicator light fails to illuminate, also no voltage reading of 115 volts AC present at pin R of TJ1.	a. Defective indicator light (DS)3..... b. Defective resistor (R1).....	a. Replace light. b. Replace resistor.
8. CHANNEL selector switch set to PITCH, pin R and C of TJ1 jumpered through a 4.7K-ohm 1-watt resistor, pin X and W of TJ1 jumpered, pin S and V of TJ1 jumpered, DC POWER switch OFF, AC POWER switch ON; AC voltage reading at TP5 or pin Z of TJ1 does not increase from 0 to 9.5 volts rms as FEEDBACK knob is rotated clockwise or counterclockwise from 0.	a. Defective capacitor (C1)..... b. Defective resistor (R6)..... c. Defective resistor (R8)..... d. Defective MODE selector switch (SW3). e. Defective transformer (T1)..... f. Defective CHANNEL selector switch (SW6).	a. Replace capacitor. b. Replace resistor. c. Replace resistor. d. Clean or replace switch as necessary. e. Replace transformer. f. Clean or replace switch as necessary.
9. CHANNEL selector switch set to PITCH, AC POWER switch OFF, DC POWER switch OFF; no resistance reading of 2K ohms $\pm 5\%$ present between pins q and f of TJ1.	Defective resistor (R4).....	Replace resistor.
10. CHANNEL selector switch set to ROLL, pins B and N of TJ2 jumpered, AC POWER switch OFF, DC POWER switch ON; amber DC light fails to illuminate.	Defective DC indicator light (DS4)....	Replace light.
11. CHANNEL selector switch set to ROLL, pins h and d of TJ1 jumpered, AC POWER switch OFF, DC POWER switch ON; NO GO indicator light to illuminate and no 27.5 ± 2 volts DC reading is present at pin D of TJ2.	a. Defective NO GO light (DS2)..... b. Defective diode (CR5)..... c. Defective CHANNEL selector switch (SW6).	a. Replace light. b. Replace diode. c. Clean or replace switch as necessary.
12. CHANNEL selector switch set to ROLL, pins m and V of TJ1 jumpered, and a function generator adjusted for an output of 1 Hz with a sine wave of 10 volts peak to peak connected between TP3 and TP4 (do not ground TP3 or TP4), AC POWER switch OFF, DC POWER switch ON; no reading of 17.5 volts dc present at TP3, TP4, and e of TJ1, also no 0.3 volts peak to peak reading at pin e of TJ1.	a. Defective diode (CR6)..... b. Defective resistor (R3)..... c. Defective resistor (R5)..... d. Defective CHANNEL selector switch (SW6). e. Defective MODE selector switch (SW3). f. Defective resistor (R2).....	a. Replace diode. b. Replace resistor. c. Replace resistor. d. Clean or replace switch as necessary. e. Clean or replace switch as necessary. f. Replace resistor.
13. CHANNEL selector switch set to ROLL, pins E and D of TJ2 jumpered, pins b and G of TJ2 jumpered, AC POWER switch OFF, DC POWER switch ON; green engaged indicator light fails to illuminate.	a. Defective ENGAGED indicator light (DS1). b. Defective CHANNEL selector switch (SW6).	a. Replace light. b. Clean or replace switch as necessary.

Symptom

Probable trouble

Correction

- | | | |
|---|---|--|
| 14. CHANNEL selector switch set to ROLL, pins T and V of TJ2 jumpered, pins T and V of TJ1 jumpered, pins i and W of TJ1 jumpered, pins R and B of TJ1 jumpered through a 4.7 K-ohm 1-watt resistor, DC POWER switch OFF, AC POWER switch ON. AC POWER indicator light fails to illuminate. | a. Defective AC indicator light (DS3). | a. Replace light. |
| | b. Defective resistor (R1)----- | b. Replace resistor. |
| 15. CHANNEL selector switch set to ROLL, pins T and V of TJ2 jumpered, pins T and V of TJ1 jumpered, pins i and W of TJ1 jumpered, pins R and B of TJ1 jumpered through a 4.7K-ohm 1-watt resistor, DC POWER switch OFF, AC POWER switch ON; no reading of 9.5 volts rms present at TP5 or pin D of TJ1 when FEEDBACK knob is rotated either clockwise or counter-clockwise from 0. | a. Defective capacitor (C1)----- | a. Replace capacitor. |
| | b. Defective resistor (R6)----- | b. Replace resistor. |
| | c. Defective resistor (R8)----- | c. Replace resistor. |
| | d. Defective MODE selector switch (SW3). | d. Clean or replace switch as necessary. |
| | e. Defective CHANNEL selector switch (SW6). | e. Clean or replace switch as necessary. |
| | f. Defective transformer (T1)----- | f. Replace transformer. |
| 16. CHANNEL selector switch set to ROLL, AC POWER switch OFF, DC POWER switch OFF, no resistance reading of 2K ohms $\pm 5\%$ between pins e and b of TJ1. | Defective resistor (R4)----- | Replace resistor. |
| 17. CHANNEL selector switch set to YAW, AC POWER switch OFF, pins B and N of TJ2 jumpered, DC POWER switch ON; amber DC indicator light fails to illuminate. | Defective DC indicator light (DS4)---- | Replace light. |
| 18. CHANNEL selector switch set to YAW, pins h and P of TJ1 jumpered, AC POWER switch OFF, DC POWER switch ON; NO GO indicator light fails to illuminate, and no 27.5 ± 2 volts DC reading present at pin F of TJ2. | a. Defective NO GO indicator light (DS2). | a. Replace light. |
| | b. Defective diode (CR5)----- | b. Replace diode. |
| | c. Defective CHANNEL selector switch (SW6). | c. Clean or replace switch as necessary. |
| 19. CHANNEL selector switch set to YAW, pins s and V of TJ1 jumpered, pins t and h of TJ1 jumpered, function generator adjusted for an output of 1 Hz with a sine wave of 10 volts peak to peak connected between TP3 and TP4 (do not ground TP3 or TP4); no reading of 17.5 volts DC at TP3, TP4, and pin N of TJ1, also no 0.3-volt peak-to-peak reading at pin N of TJ1. | a. Defective diode (CR6)----- | a. Replace diode. |
| | b. Defective resistor (R3)----- | b. Replace resistor. |
| | c. Defective CHANNEL selector switch (SW6). | c. Clean or replace switch as necessary. |
| | d. Defective MODE selector switch (SW3). | d. Clean or replace switch as necessary. |
| | e. Defective resistor (R2)----- | e. Replace resistor. |
| 20. CHANNEL selector switch set to YAW, pins C and D of TJ2 jumpered, pins e and G of TJ2 jumpered, AC POWER switch OFF, DC POWER switch ON; green ENGAGED indicator light fails to illuminate. | a. Defective indicator light (DS1)---- | a. Replace light. |
| | b. Defective CHANNEL selector switch (SW6). | b. Clean or replace switch as necessary. |

Symptom	Probable trouble	Correction
21. CHANNEL selector switch set to YAW, pins U and V of TJ1 jumpered, pins J and W of TJ1 jumpered, pins R and Y of TJ1 jumpered through a 4.7K ohm 1 watt resistor, pins T and V of TJ2 jumpered, DC POWER switch OFF, AC POWER switch ON; AC indicator light fails to illuminate.	a. Defective AC indicator light (DS3) b. Defective resistor (R1)	a. Replace light. b. Replace resistor.
22. CHANNEL selector switch set to YAW, pins U and V of TJ1 jumpered, pins j and W of TJ1 jumpered, pins R and y of TJ1 jumpered through a 4.7K-ohm 1-watt resistor, pins T and V of TJ2 jumpered, DC POWER switch OFF, AC POWER switch ON; no reading of 9.5 volts rms at TP5 or E of TJ1 when FEEDBACK knob is rotated clockwise or counter-clockwise from 0.	a. Defective capacitor (C1) b. Defective resistor (R6) c. Defective resistor (R8) d. Defective MODE selector switch (SW3) e. Defective CHANNEL selector switch (SW6) f. Defective transformer (T1)	a. Replace capacitor. b. Replace resistor. c. Replace resistor. d. Clean or replace switch as necessary. e. Clean or replace switch as necessary. f. Replace transformer.
23. CHANNEL selector switch set to YAW, AC POWER switch OFF, DC POWER switch OFF; no resistance reading of 2K ohms $\pm 5\%$ between pins L and M of TJ1.	Defective resistor (R4)	Replace resistor.
24. CHANNEL selector switch set to YAW, connect a function generator set for an output of 10 volts peak to peak and a sine wave of 400 Hz with the high side jumpered through a 68K ohm resistor to pin K of TJ1 and low side to GRD, AC and DC POWER switches ON; No reading of approximately 2.75 volts peak to peak at 400 Hz present at pin K of TJ1.	a. Defective capacitor (C7) b. Defective transistor (Q5) c. Defective resistor (R5) d. Defective resistor (R31) e. Defective resistor (R32) f. Defective resistor (R33) g. Defective resistor (R25) h. Defective diode (CR5)	a. Replace capacitor. b. Replace transistor. c. Replace resistor. d. Replace resistor. e. Replace resistor. f. Replace resistor. g. Replace resistor. h. Replace diode.

6-7. Checking Control Channel Mode Circuitry.

(fig. 9-8)

Symptoms, causes, and corrective measures are given in chart form below. Unless otherwise specified the MODE selector switch is to remain in MOD position and the FEEDBACK knob at 0 during all troubleshooting procedures in this paragraph. Return all power switches to OFF and remove all jumpers after each symptom check.

Symptom	Probable trouble	Correction
1. CHANNEL selector switch set to PITCH, AC and DC POWER switches OFF; no resistance reading of 2K ohms $\pm 5\%$ between pins E and T of TJ4.	Defective resistor (R4)	Replace resistor.

Symptoms	Probable trouble	Correction
2. CHANNEL selector switch set to PITCH, extender cord inserted into TJ4, DC POWER switch OFF, AC POWER switch ON; amber AC indicator light fails to illuminate. Also no reading of approximately 4 to 5 volts rms present at pin R of TJ4 as FEEDBACK knob is rotated clockwise or counterclockwise from 0.	a. Defective AC indicator light (DS3) -- b. Defective AC fuse (F2) ----- c. Defective resistor (R1) ----- d. Defective MODE selector switch (SW3). e. Defective capacitor (C1) ----- f. Defective transformer (T1) ----- g. Defective resistor (R6) ----- h. Defective resistor (R8) ----- i. Defective CHANNEL selector switch (SW6). j. Defective transformer (T2) -----	a. Replace light. b. Replace fuse. c. Replace resistor. d. Clean or replace switch as necessary. e. Replace capacitor. f. Replace transformer. g. Replace resistor. h. Replace resistor. i. Clean or replace switch as necessary. j. Replace transformer.
3. CHANNEL selector switch set to PITCH, extender cord inserted into TJ4, AC POWER switch OFF, DC POWER switch ON; amber DC indicator light fails to illuminate, also no 27.5 $\pm$ 2 volts DC reading present at pins S and D of TJ4.	a. Defective DC fuse (F1) ----- b. Defective indicator light (DS4) ----- c. Defective DC POWER switch (SW1).	a. Replace fuse. b. Replace light. c. Replace switch.
4. CHANNEL selector switch set to PITCH, pins D and C of TJ4 jumpered, AC POWER switch OFF, DC POWER switch ON; NO GO indicator light fails to illuminate, also DC indicator light fails to illuminate.	a. Defective NO GO indicator light (DS2). b. Defective DC indicator light (DS4) -- c. Defective diode (CR4) -----	a. Replace light. b. Replace light. c. Replace diode.
5. CHANNEL selector switch set to PITCH, extender cord inserted into TJ4, pins D and F of TJ4 jumpered, through a 2.2K-ohm $\frac{1}{4}$ -watt resistor, AC and DC POWER switches ON. Connect oscilloscope and observe a wave form at pin F of TJ4 as illustrated in figure 8-1; also observe a wave form at pin H of TJ4 as shown in figure 8-2.	If wave forms shown as described in symptom column do not conform to given values, refer to Wave Form Analysis Chart (fig. 6-1) for probable trouble and corrections.	
6. CHANNEL selector switch set to PITCH, pins J and K of TJ4 jumpered, AC POWER switch OFF, DC POWER switch ON; no reading of approximately 10 volts at pin M of TJ4, TP3, and TP4.	a. Defective resistor (R3) ----- b. Defective resistor (R5) ----- c. Defective diode (CR6) ----- d. Defective diode (CR7) ----- e. Defective resistor (R7) ----- f. Defective MODE selector switch (SW3). Defective resistor (R2) -----	a. Replace resistor. b. Replace resistor. c. Replace diode. d. Replace diode. e. Replace resistor. f. Clean or replace switch as necessary. Replace resistor.
7. CHANNEL selector switch set to PITCH, function generator adjusted for an output of 10 volts peak to peak and a sine wave of 1 Hz connected between TP3 and TP4 (do not ground TP3 or TP4), AC POWER switch OFF, pins J and K of TJ4 jumpered, DC POWER switch ON; no reading of approximately 0.3- to 0.4-volt peak-to-peak (1Hz) out at pin M of TJ4.		

Symptom	Probable trouble	Corrections
8. CHANNEL selector switch set to PITCH, pins L and K of TJ4 jumpered, function generator adjusted for an output of 10 volts peak to peak and a sine wave of 1 Hz connected between TP6 and ground, AC and DC POWER switches ON; no reading of 0.25-volt peak-to-peak output between pin P of TJ4 and GRD.	a. Defective resistor (R11)----- b. Defective resistor (R12)----- c. Defective resistor (R13)----- d. Defective resistor (R14)----- e. Defective resistor (R15)----- f. Defective resistor (R9)----- g. Defective resistor (R10)----- h. Defective resistor (R16)----- i. Defective resistor (R17)----- j. Defective resistor (R18)----- k. Defective diode (CR8)----- l. Defective diode (CR9)----- m. Defective transistor (Q1)----- n. Defective capacitor (C2)----- o. Defective capacitor (C3)----- p. Defective capacitor----- q. Defective transformer (T3)----- r. Defective magnetic modulator transformer (A1).	a. Replace resistor. b. Replace resistor. c. Replace resistor. d. Replace resistor. e. Replace resistor. f. Replace resistor. g. Replace resistor. h. Replace resistor. i. Replace resistor. j. Replace resistor. k. Replace diode. l. Replace diode. m. Replace transistor. n. Replace capacitor. o. Replace capacitor. p. Replace capacitor. q. Replace transformer. r. Replace transformer.
9. CHANNEL selector switch set to PITCH, connect function generator set for an output of 10 volts peak to peak and a sine wave of 400 Hz with the high side jumpered through a 68.0K ohm resistor to pin N of TJ4 and low side to GRD. AC and DC POWER switches ON; no reading of approximately 2.75 v volts peak to peak at 400 Hz present at pin N of TJ4.	a. Defective capacitor (C8)----- b. Defective transistor (Q5)----- c. Defective resistor (R26)----- d. Defective resistor (R27)----- e. Defective resistor (R28)----- f. Defective resistor (R29)----- g. Defective resistor (R25)----- h. Defective diode (CR12)-----	a. Replace capacitor. b. Replace transistor. c. Replace resistor. d. Replace resistor. e. Replace resistor. f. Replace resistor. g. Replace resistor. h. Replace diode.

6-8. Checking Pylon Compensator Unit Mode Circuitry.

(fig. 9-8)

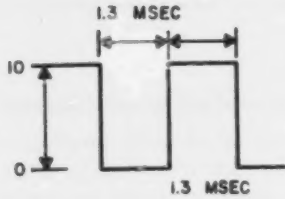
Symptoms, causes, and corrective measures are given in chart form below. The position of the MOD selector, CHANNEL selector or FEEDBACK knob does not effect the following test.

Symptom	Probable trouble	Correction
1. AC and DC POWER switches OFF: a. No reading of $510 \pm 5\%$ ohms from TP10 to pin E of TJ5. b. No reading of $510 \pm 5\%$ ohms from TP10 to pin H of TJ5. c. No reading of $510 \pm 5\%$ ohms from TP8 to pin F of TJ5. d. No reading of $510 \pm 5\%$ ohms from TP8 to pin G of TJ5. e. No reading of $68K \pm 5\%$ ohms from pin K of TJ5 to GRD.	a. Defective resistor (R35)----- b. Defective resistor (R34)----- c. Defective resistor (R37)----- d. Defective resistor (R36)----- e. Defective resistor (R38)-----	a. Replace resistor. b. Replace resistor. c. Replace resistor. d. Replace resistor. e. Replace resistor.
2. AC POWER switch OFF, DC POWER switch ON; no reading of 27.5 ± 2 volts dc from pin D of TJ5 to GRD.	a. Defective DC fuse (F1)----- b. Defective DC POWER switch (SW1).	a. Replace fuse. b. Replace switch.

IF THERE IS NO PULSE OUTPUTS AT PINS H AND F OF TJ4 WITH THE CONTROL CHANNEL ASSEMBLY INSERTED THE FOLLOWING WAVEFORMS SHOULD BE PRESENT FOR CORRECT OPERATION.

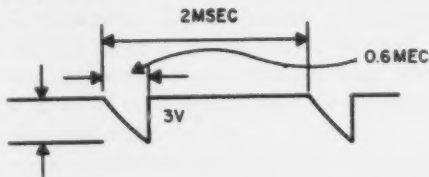
IF NOT, CHECK C6, R22, CR11, Q3

1. CATHODE OF CR9



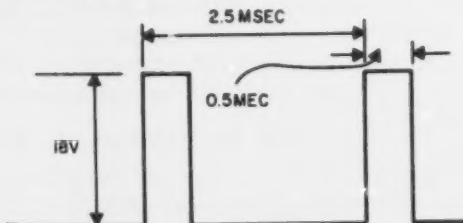
IF NOT, CHECK F2, SW2, CR9, R19

2. BASE OF Q2



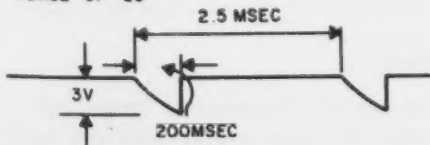
IF NOT, CHECK C5, R20, CR10, Q2, CR7, R7

3. COLLECTOR OF Q2

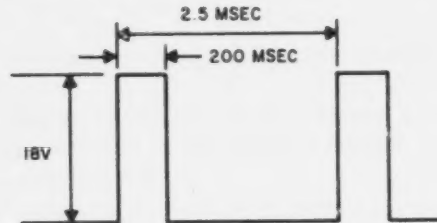


IF NOT CHECK Q2, R21

4. BASE OF Q3

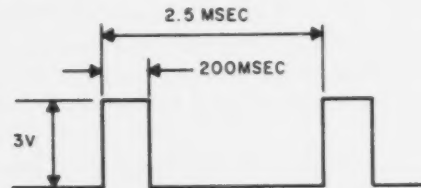


5. COLLECTOR OF Q3



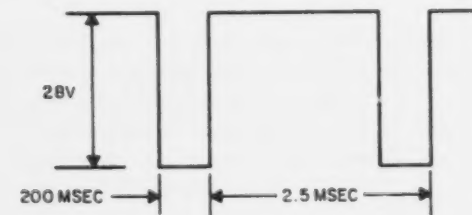
IF NOT, CHECK Q3, R23, R24

6. BASE OF Q4



IF NOT, CHECK Q4, R24

7. COLLECTOR OF Q4



CHECK Q4

TM6625-1704-15-28

Figure 6-1. Waveform analysis chart.

CHAPTER 7

REPAIRS AND ADJUSTMENT

Section I. REPAIRS

7-1. General Parts Replacement Techniques

a. No unusual procedures are involved in the replacement of parts in the AN/ASM-338. The customary care must be observed in replacing transistors or diodes. Avoid excessive heat when soldering; use a 25-watt, pencil-type solder iron. If possible, use a heat sink or clamp a pair of long-nose pliers between a solder joint and the diode or transistor. Do not use soldering guns because of the danger of inductive voltages being generated in components. Make certain that the test panel, when undergoing repair, is disconnected from the powerline.

b. When replacing components, be careful to avoid creating mechanical stresses or strains that may cause ultimate, if not immediate, breakdown. In general, the components and structures in the AN/ASM-338 are easily accessible (figs. 7-1 and 7-3). Thus, replacement of such items is no problem, and standard techniques of demounting, remounting, and soldering are used.

7-2. Replacement of Parts

a. *General.* To gain access to interior of the AN/ASM-338 remove test panel 570-091-018-1 in accordance with the procedures given in paragraph 4-9e.

b. *Circuit Board Assembly 570-091-029.* Test procedures for this subassembly appear in chapter

6. If test discloses a fault remove the subassembly as follows:

(1) Remove the three machine screws and spacers that secure it to the support bracket of the test panel (fig. 7-3).

(2) Unsolder the twelve leads connecting the terminals on the subassembly to terminals of components mounted on the test panel.

(3) Lift out the subassembly. All components comprising the circuit board assembly will now be exposed for replacement (fig. 7-4).

c. *Circuit Board Assembly 570-091-007.* Test procedures for this subassembly appear in chapter 6. If test discloses a fault, remove the subassembly as follows:

(1) Accomplish step b (1) of paragraph 7-2.

(2) Grasp 570-091-029 circuit board and fold gently away from circuit board 570-091-007.

(3) Remove the three remaining machine screws and cable clamps that secure the 570-091-007 to the support bracket of the test panel (fig. 7-3).

(4) Unsolder the forty-three leads connecting the terminals on the subassembly to terminals of components mounted on the test panel.

(5) Lift out the subassembly. All components comprising the circuit board assembly will now be exposed for replacement (fig. 7-5).

Section II. CABLE REPAIR

If cable repair is necessary, be careful not to damage any reusable portion of the assembly. Do not use excessive heat when unsoldering leads, and avoid spattering solder over connector surfaces. Be sure that connector pins are not bent or distorted. To repair cables using connectors containing crimp-type contact pins, identify manufacturer (stamped on connector). Replace contact pins

using respective manufacturers extraction, crimping, insertion tools, and instructions as applicable to each individual connector.

7-3. Extender Board 570-091-011-1

(fig. 7-6)

Replacement of connectors on extender board is not recommended. Broken or damaged etched con-

TM 11-6625-1704-15

ductors and test point jacks may be repaired using standard solder techniques, otherwise replace entire extender board assembly.

7-4. Cable Assembly 570-091-004-1

Refer to figure 7-7 for schematic diagram and connector pin arrangement.

7-5. Cable Assembly 570-091-026-1

Refer to figure 7-8 for schematic diagram and connector pin arrangement.

7-6. Cable Assembly 570-091-027-1

Refer to figure 7-9 for schematic diagram and connector pin arrangement.

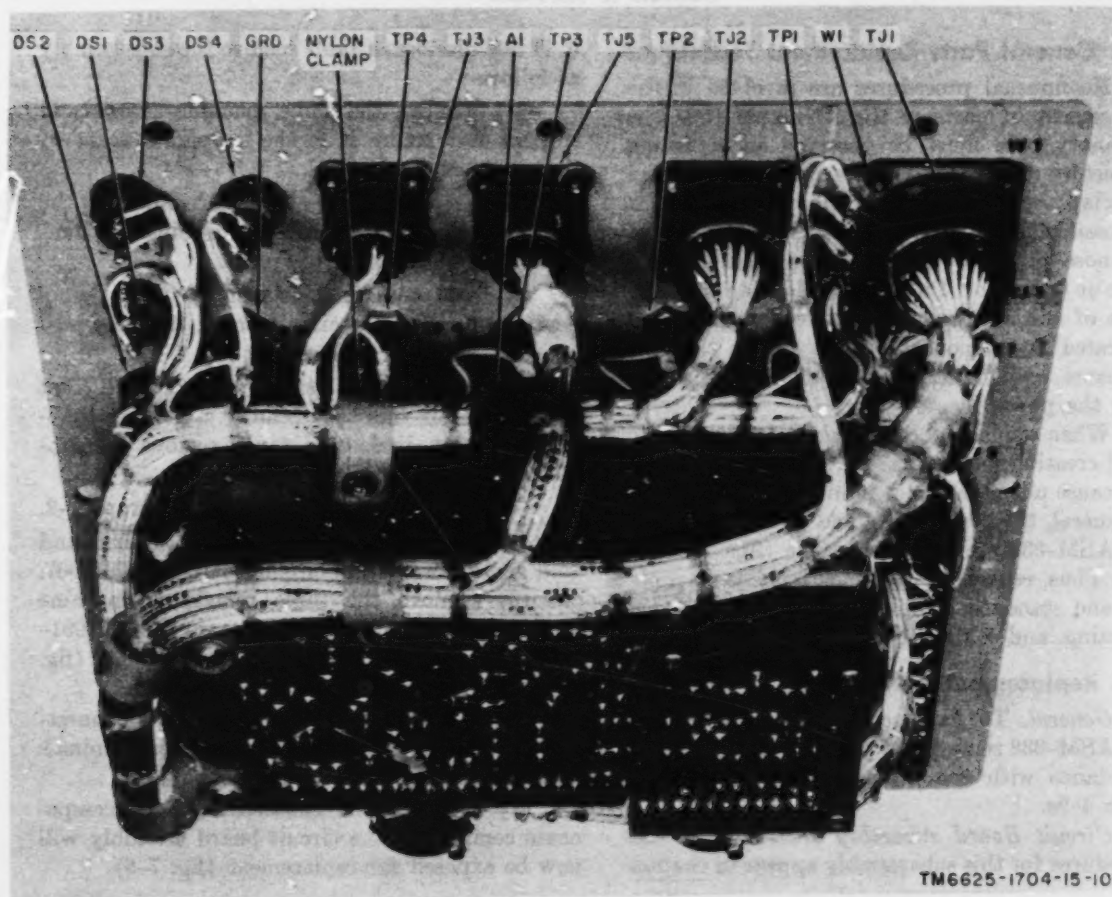


Figure 7-1. Test panel 570-091-018-1, rear view showing test points, indicator lights, and ground bus.

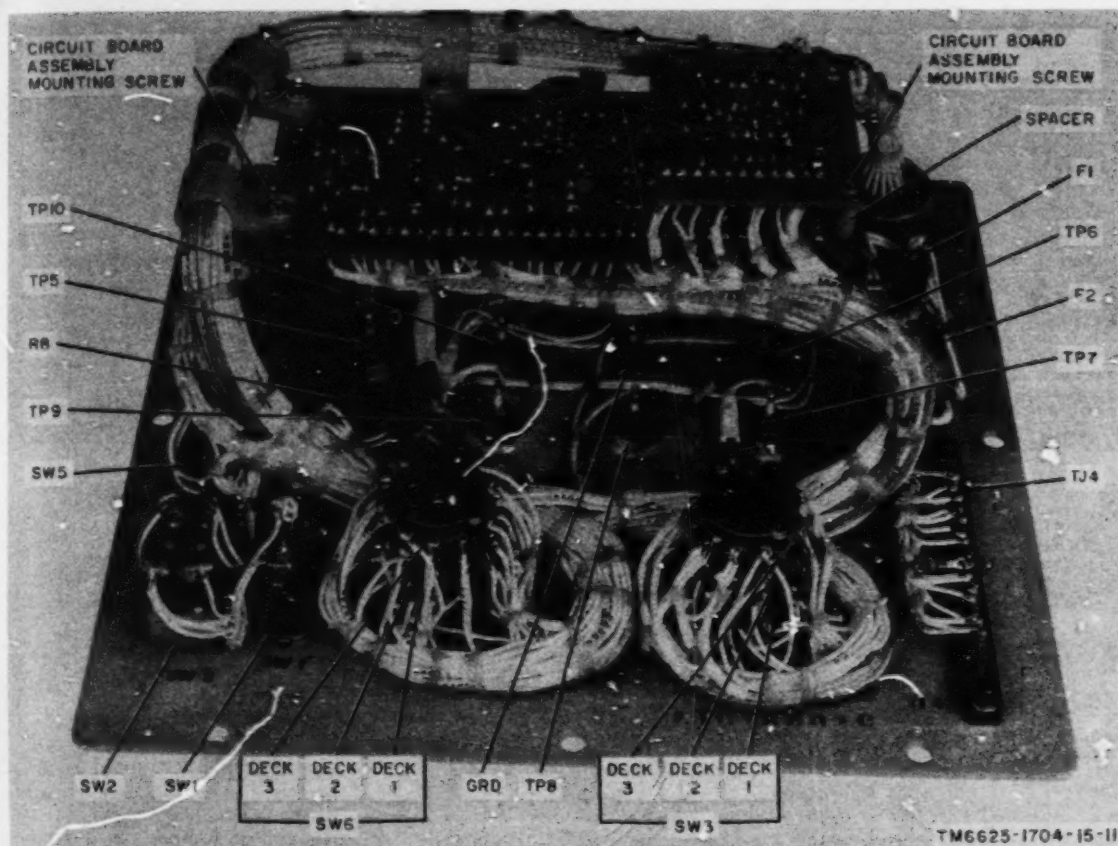


Figure 7-2. Test panel 570-091-018-1, rear view showing test points and controls.

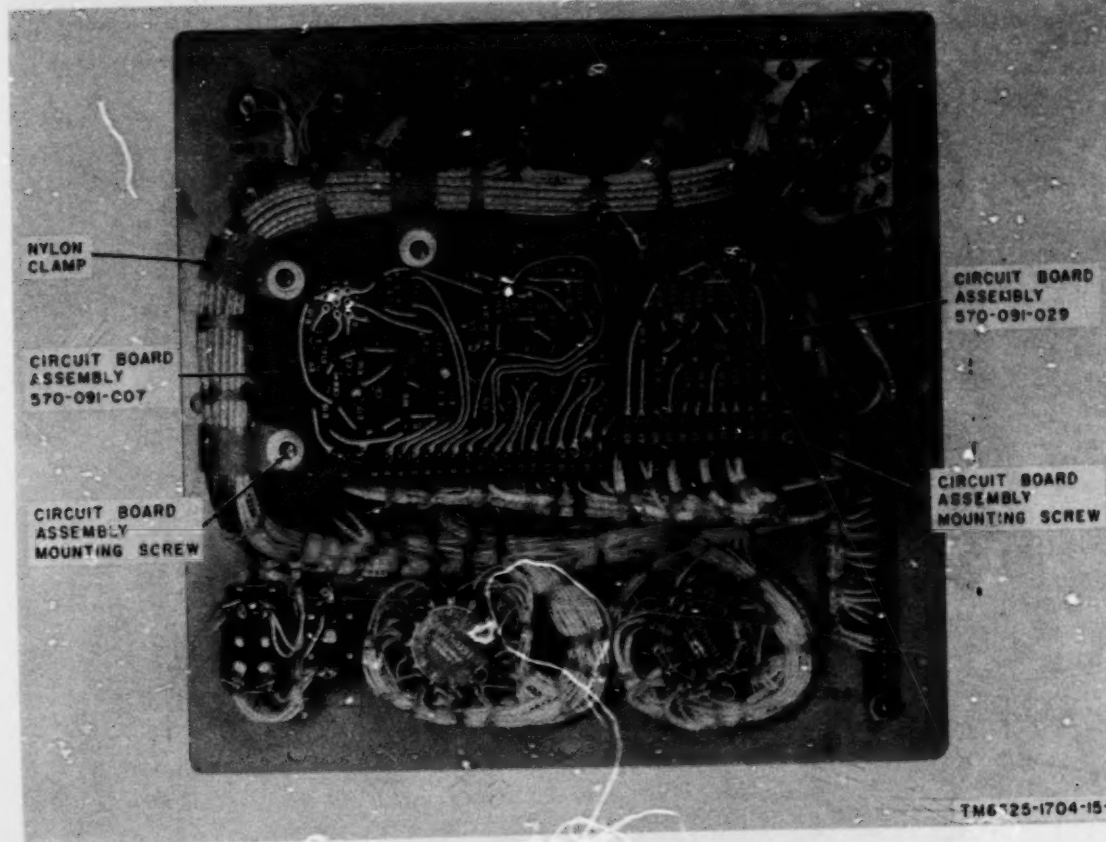


Figure 7-3. Test panel 570-091-018-1, rear view showing circuit boards and mounting hardware.

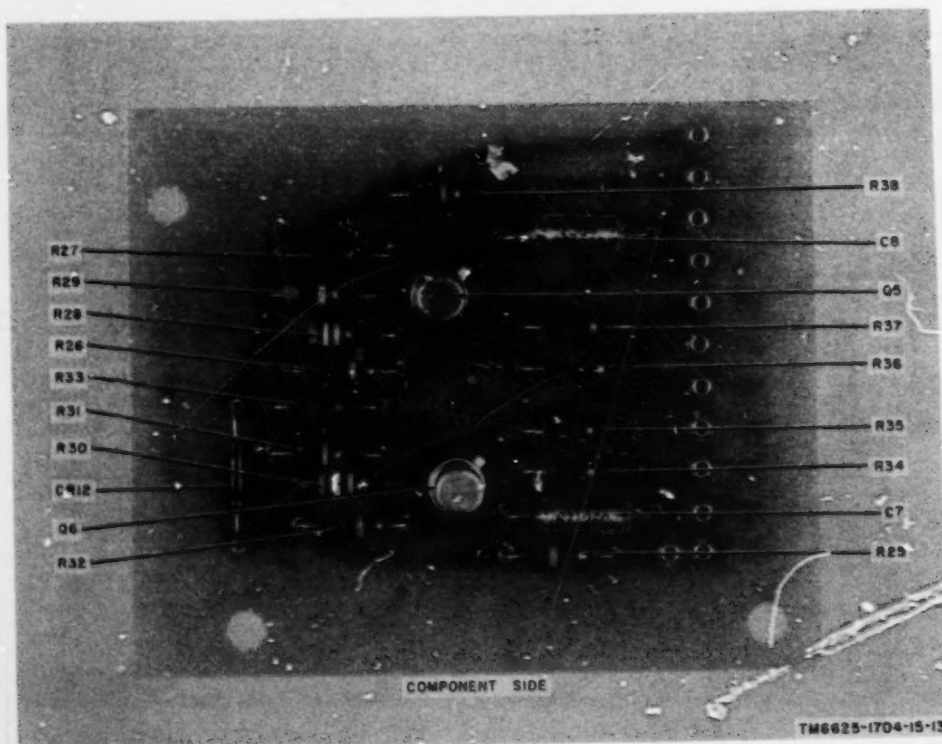
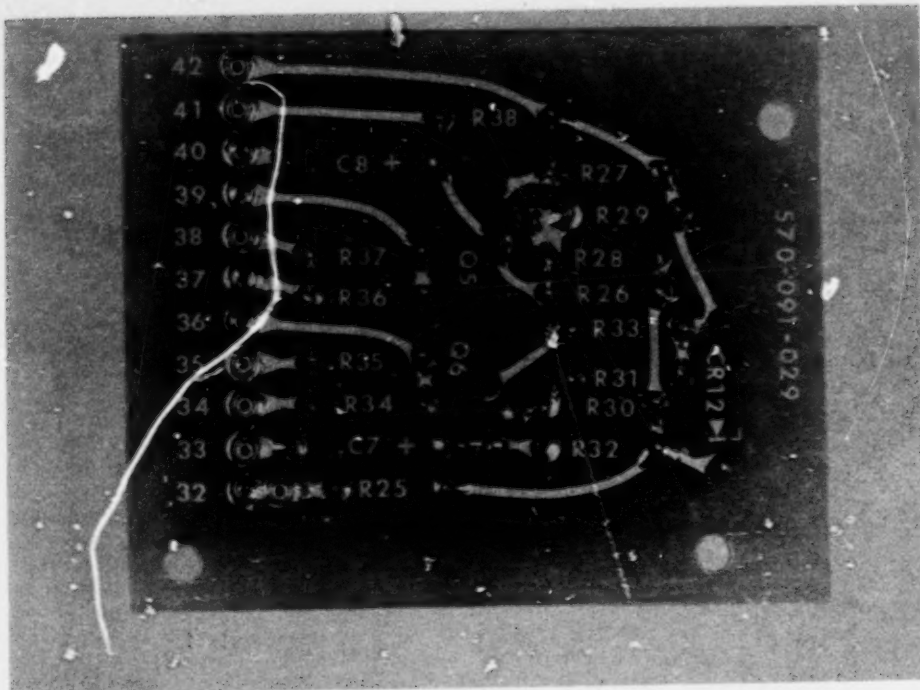
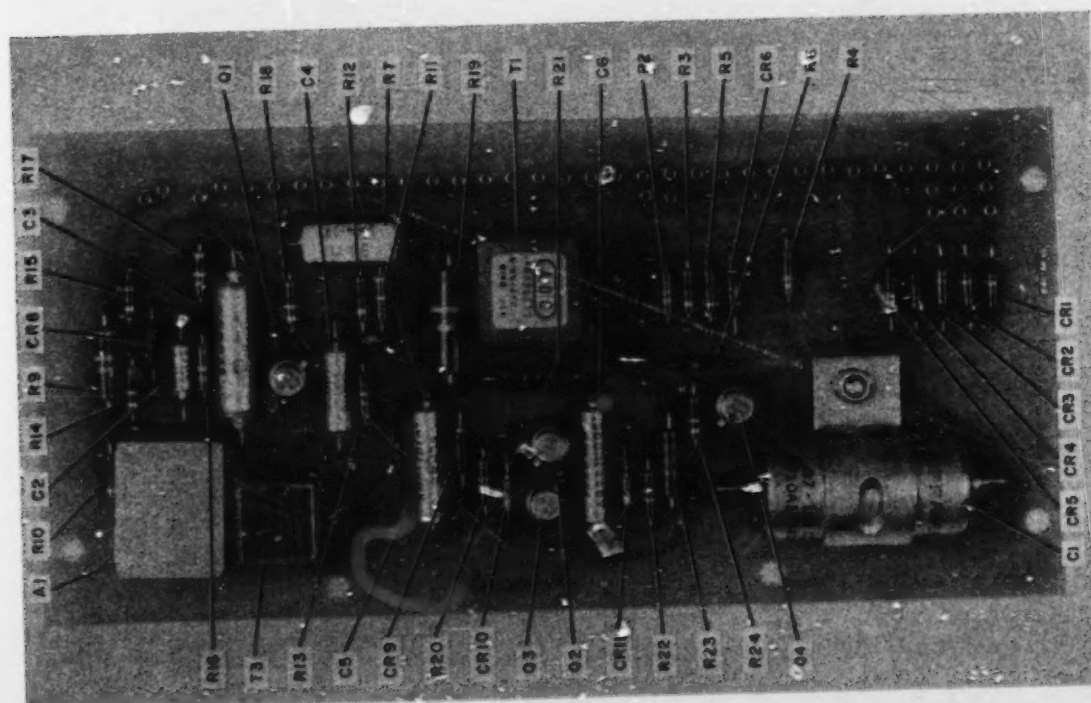
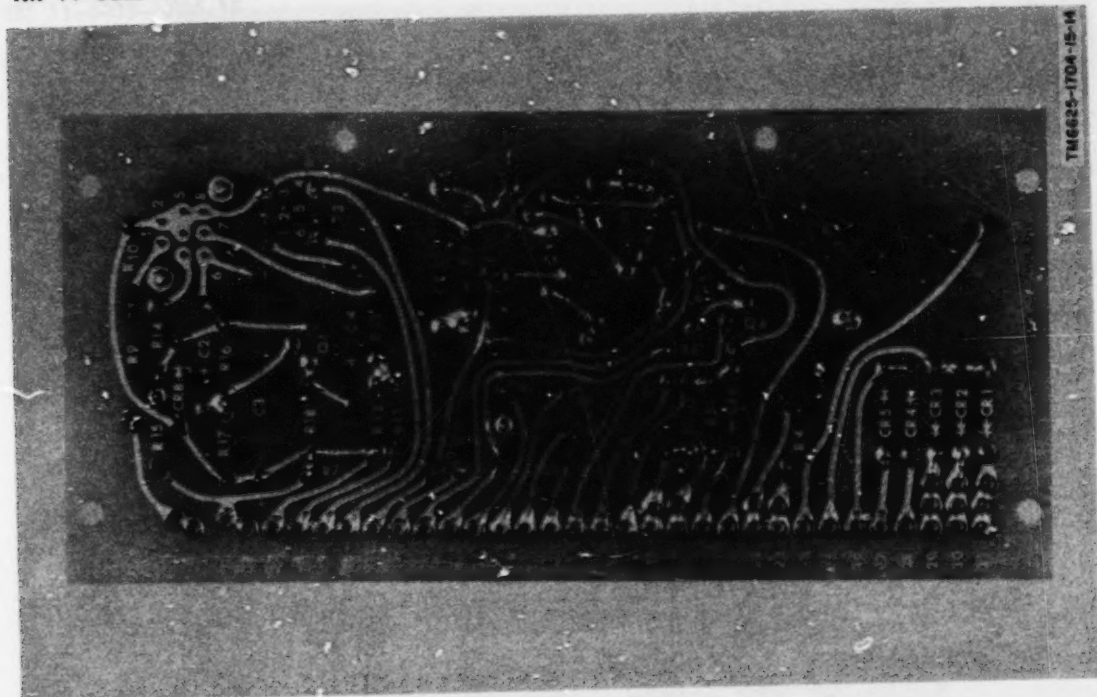


Figure 7-4. Circuit board assembly 570-091-029, component location and solder points.



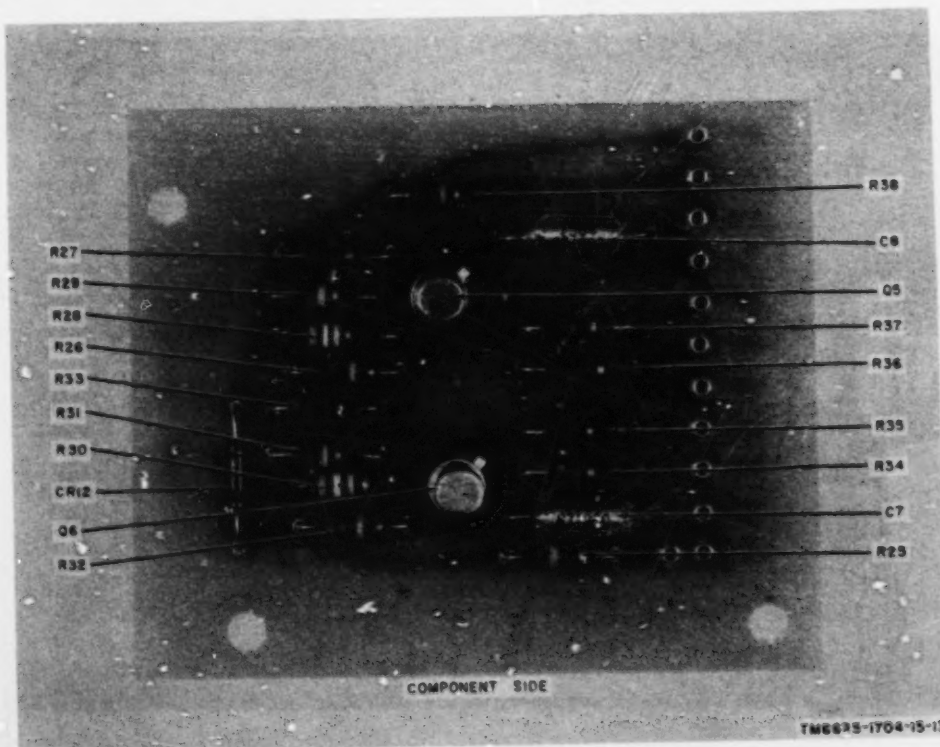
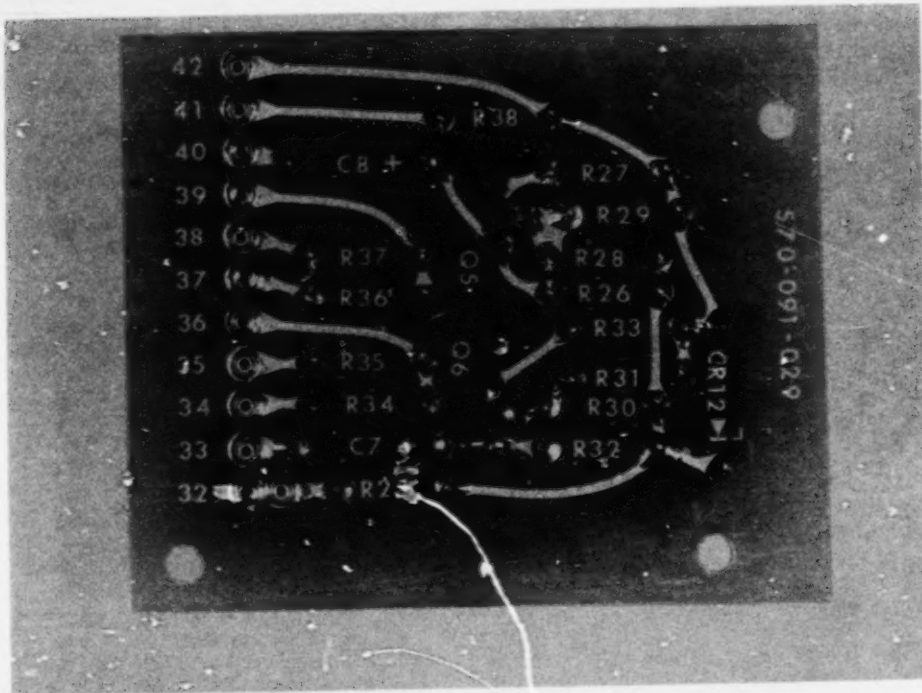
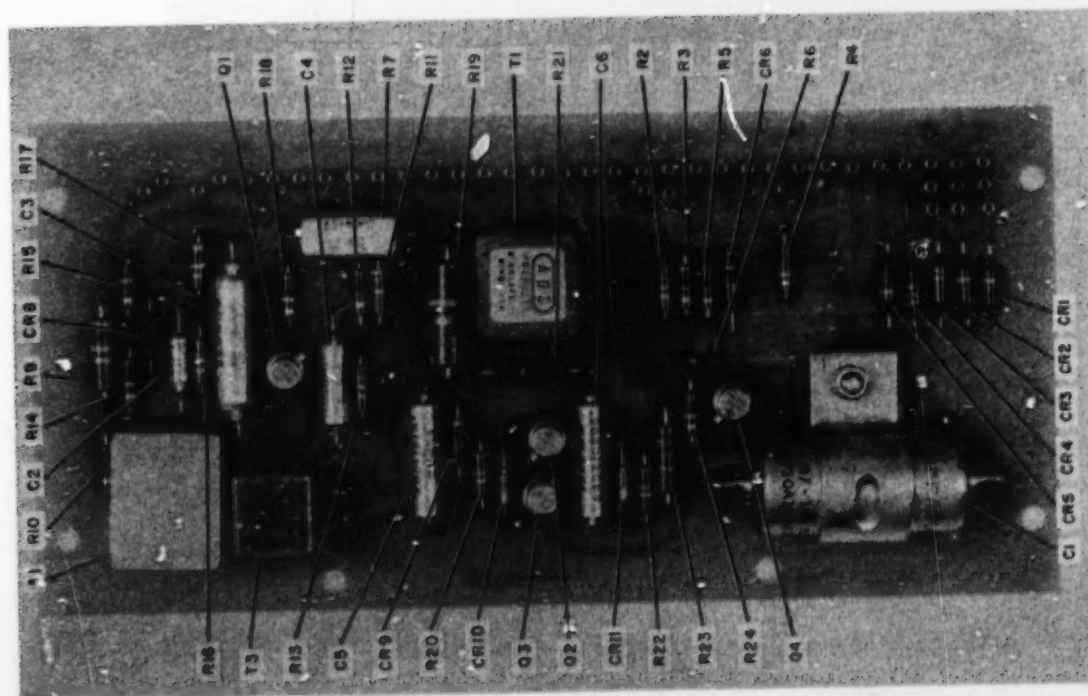
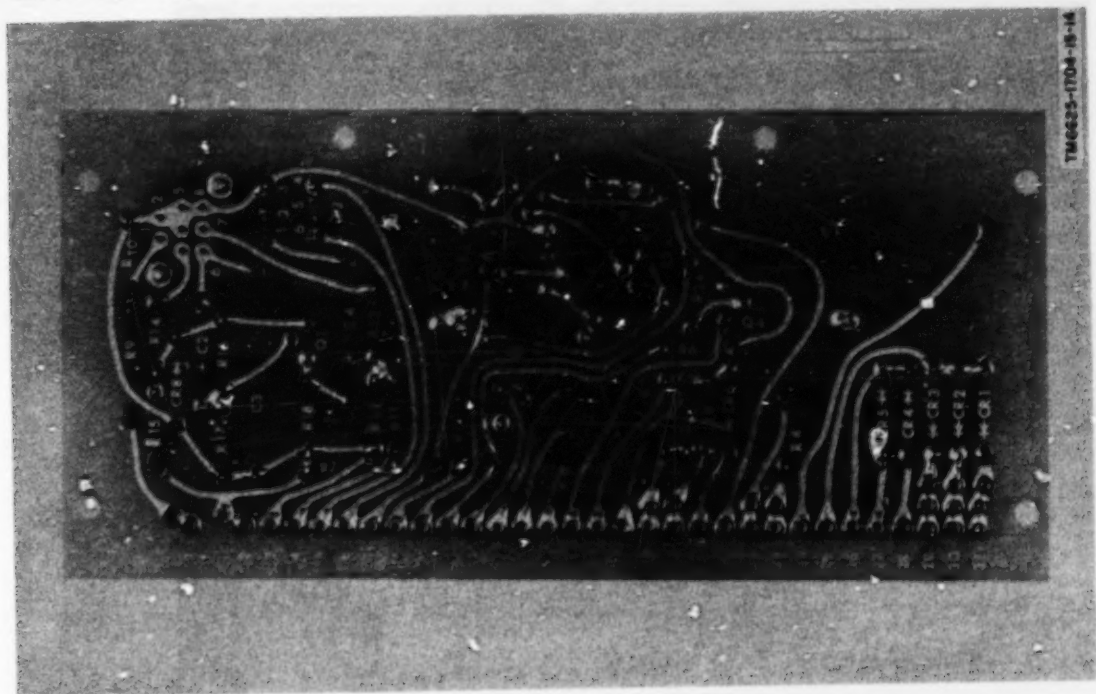
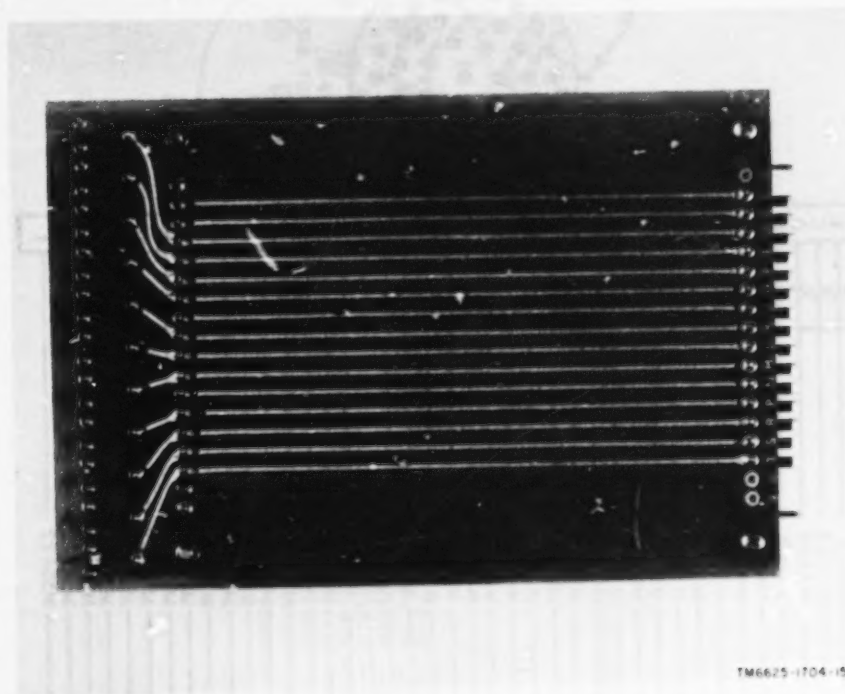


Figure 7-4. Circuit board assembly 570-091-029, component location and solder points.



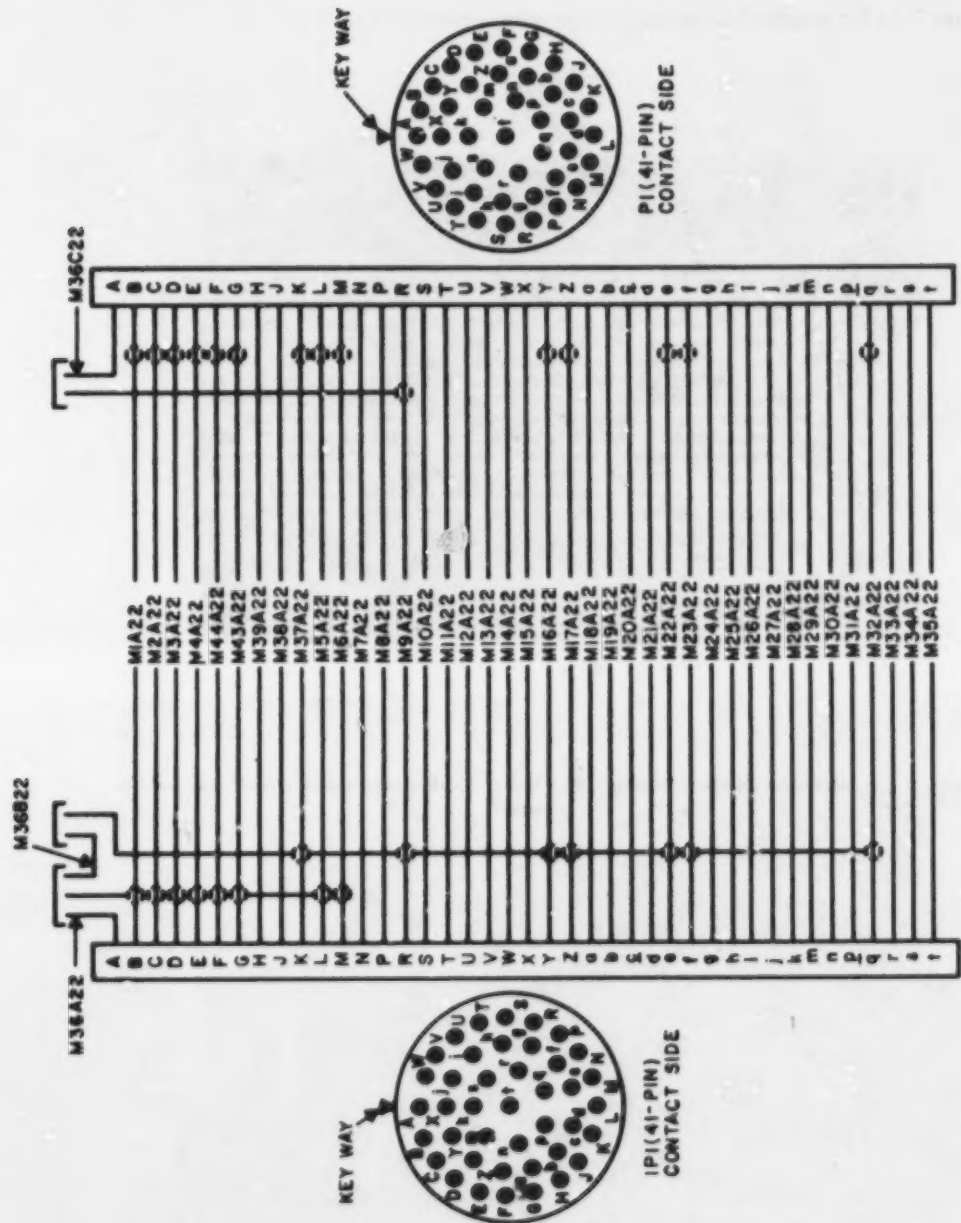
7-7. Cable Assembly 570-091-028-1

Refer to figure 7-10 for schematic diagram and connector pin arrangement.



TM6625-1704-15-15

Figure 7-6. Extender board assembly 570-091-011-1, showing etched circuit and solder points.



IPI
MS3126F-204IS

PI
MS3126F-20-4IP

TM6625-1704-15-16

Figure 7-7. Special purpose electrical cable assembly 570-091-004-1, schematic diagram.

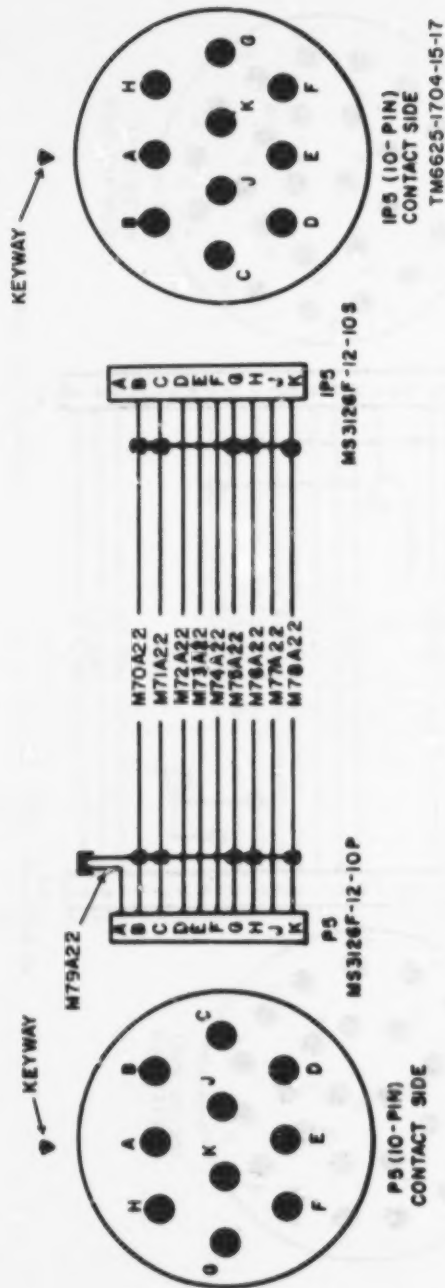
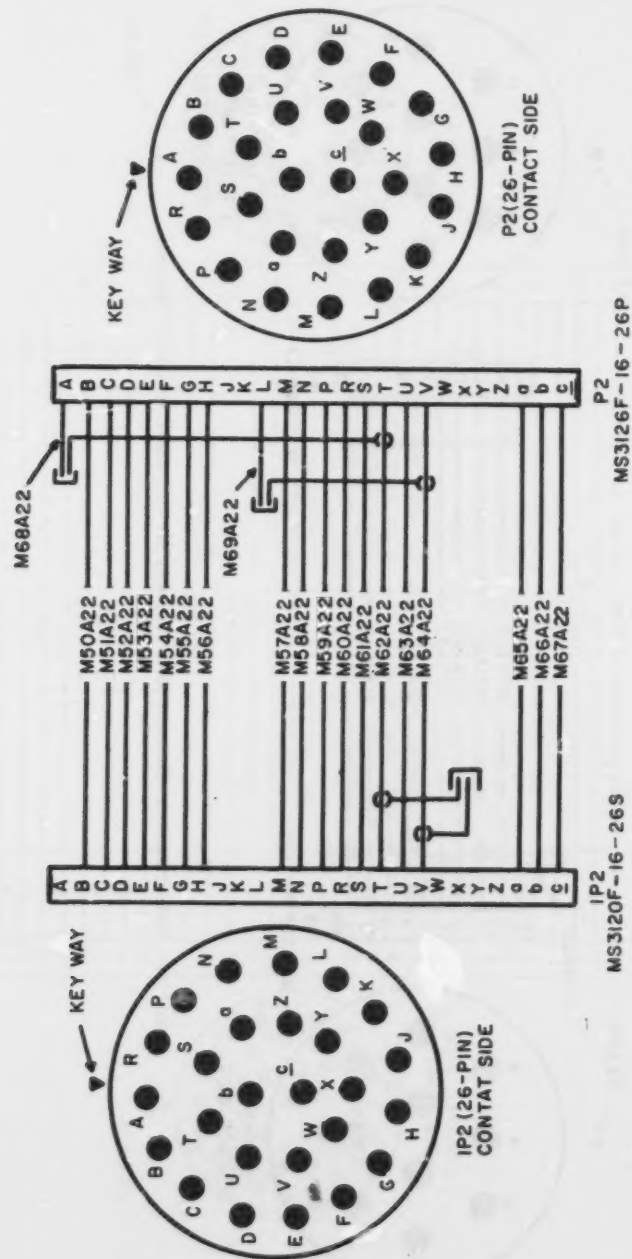
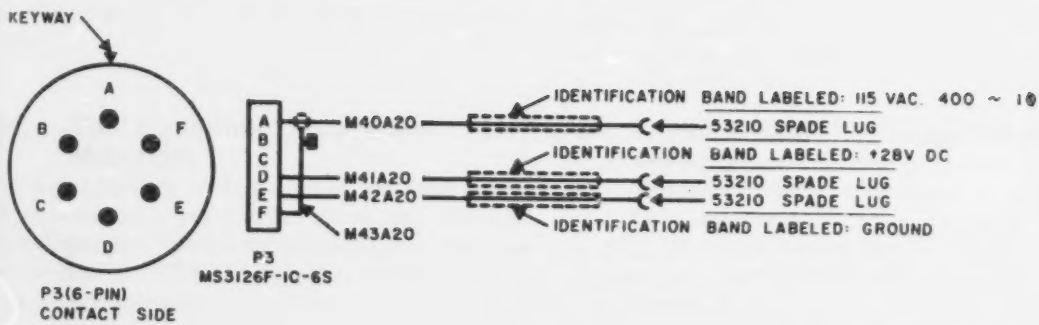


Figure 7-8. Special purpose electrical cable assembly 570-031-026-1, schematic diagram.



TM6625-1704-15-18

Figure 7-9. Special purpose electrical cable assembly 570-091-027-1, schematic diagram.



TM6625-1704-15-19

Figure 7-10. Special purpose electrical cable assembly 570-091-028-1, schematic diagram.

CHAPTER 8

GENERAL SUPPORT TESTING PROCEDURES

8-1. General Instructions

a. Testing procedures are prepared for use by maintenance organizations responsible for general support maintenance of electronics equipment to determine the acceptability of repaired equipment. These procedures set forth specify requirements that repaired equipment must meet before it is returned to the using organization. These procedures may also be used as a guide for testing equipment that has been repaired at direct support, if the proper tools and test equipments are available.

b. Comply with the instructions preceding each chart before proceeding to the chart. Perform each step in sequence. Do not vary the sequence. For each step, perform all the actions required in the Control settings columns; then perform each specific test procedure and verify it against its performance standard.

8-2. Test Equipment, Tools, and Materials

All test equipment, tools, materials, and other equipment required to perform the testing procedures in this chapter are listed in the following charts and are authorized under TA 11-17 and TA 11-100 (11-17).

a. Test Equipment.

Commercial test equipment

Multimeter, Simpson model 260.
Multimeter, Hewlett-Packard model 400H.
Oscilloscope, Hewlett-Packard model 130C.
Function Generator, Hewlett-Packard model 202A.

Equivalent Army test equipment

Multimeter AN/USM-223.
Voltmeter, Electronic ME-30E/U.
Oscilloscope AN/USM-281A
Generator, Signal SG-321/U.
Test Set, Semi-Conductor TS-1836C/U.

b. *Tools and Materials.* Tool Kit, Electronic Equipment TK-105/G is required for general support testing procedures.

8-3. Modification Work Orders

The performance standards listed in the tests (paras 8-4 through 8-10) are based on the assumption that all modification work orders have been performed. A listing of current modification work orders will be found in DA Pam 310-7.

8-4. Physical Tests and Inspections

a. Test Equipment and Materials. None.

b. Test Connections and Conditions.

(1) No connections.

(2) Electronic System Test Set AN/ASM-338 in its case; case closed and latched.

c. Procedure.

Step No.	Control settings	Test equipment	Test panel	Test procedure	Performance standard
1	None			Check exterior of case for damage, missing parts, and condition of painted parts.	Exterior will be clean; painted surfaces will not be scraped or scratched to bare metal; the following will not be damaged or missing: carrying handle, 2 latches, 2 identification plates, and 1 relief valve; identification plates will be legible.
2	None			Open latches by pulling latch tabs up . .	As each latch tab is pulled up, latch hook will move clear of latch groove.
3	None			Press and release relief valve, and then take top half of case off bottom half, and put it down on its feet. (To remove top half, raise side opposite hinges as high as it will go, lower it toward hinge side until its handle is about 3 inches above bench, and separate top half from bottom half by disengaging hinge pins.)	Inside painted surface of case will not be scraped or scratched to bare metal; the following will not be damaged or missing: 2 hinges and hinge pins, retaining plate (hinged to inside of top half).

TM 11-6625-1704-15

Step No. Control settings

Test equipment	Test panel	Test procedure	Performance standard
4 None		Release 2 press type fasteners on plate, and lift plate up on hinges as far as it will go.	Press type fasteners will not be damaged or missing; retaining plate hinge will not be damaged; painted surfaces will not be scraped or scratched to bare metal.
5 None		Remove accessory kit from top half of case, and inspect inside of top half of case.	Inside of case will be clean and free of damage; painted surfaces will not be scraped or scratched to bare metal.
6 None		Inspect test cables and accessories, for loss or damage.	All test cables and accessories will be present or accounted for and not damaged; cables will not be cut or broken; connector pins will not be bent or broken; female contacts in connectors will be clean.
7 None	Any	On test panel, actuate all toggle switch handles, turn all control knobs through limit of their travel, inspect test jacks, connectors, and indicator lights; press, release and inspect and reinsert fuses and holders.	Toggle switches will not be loose and will snap firmly into marked positions; controls will turn freely without binding or excessive looseness; test jacks and connectors will not be loose and will be clean; indicator lights will not be loose, missing, or broken; fuses will be in fuse holders.
8 None		Inspect 8 screws that hold test panel to bottom half of case and other screws that hold electrical components in place, and identification plate.	Screws will not be loose or missing; identification plate will not be damaged or missing and will be legible.

8-5. Test Set Check-Control Panel Mode

Note. All test checks (paras 8-5 through 8-9) will require test panel to be connected to power sources as described in paragraph 2-4.

Connect test equipment as shown in figures 9-4 through 9-7 as applicable and accomplish the following steps.

- Set MODE selector switch to CP.
- Set CHANNEL selector switch to PITCH.
- Set AC POWER switch ON.
- Set DC POWER switch ON.
- Measure +28 volts dc at pins U and B of TJ2.
- Press NO GO test switch and measure +28 volts dc at pins R, D, and F of TJ2.

g. Turn DC POWER switch OFF and measure at pin G of TJ2 for continuity to ground.

h. Jumper pin B of TJ2 to pin S of TJ2. Jumper pin G of TJ2 to pin of TJ2. Turn DC POWER switch ON and green ENGAGED light will illuminate. Turn DC POWER switch OFF and remove jumpers.

i. Change CHANNEL selector to ROLL. Jumper pin E of TJ2 to pin B of TJ2. Jumper pin b of TJ2 to pin G of TJ2. Turn DC POWER switch ON and the green ENGAGED indicator light will illuminate. Turn DC POWER switch OFF and remove jumpers.

j. Change CHANNEL selector switch to YAW. Jumper pin C of TJ2 to pin B of TJ2. Jumper pin C of TJ2 to pin G of TJ2. Turn DC POWER switch ON and green ENGAGED indicator light

will illuminate. Turn DC POWER switch OFF and remove jumpers.

k. Check continuity from pin P of TJ2 to ground. Press EMER DISENGAGE switch and continuity will disappear.

l. Jumper from pin B of TJ2 to pin M of TJ2. Turn AC and DC POWER switch ON. Amber DC indicator light will illuminate. Turn AC POWER switch OFF and DC light will extinguish. Turn DC POWER switch OFF and remove jumpers.

m. Jumper pin B of TJ2 to pin N of TJ2. Turn DC POWER switch ON. Amber DC indicator light will illuminate. Turn DC POWER switch OFF and remove jumpers.

n. Turn AC POWER switch ON and measure 115 volts ac at pin T of TJ2. Turn AC POWER switch OFF.

o. Jumper pin T of TJ2 to pin V of TJ2. Turn AC POWER switch ON and amber AC indicator light will illuminate. Turn AC POWER switch OFF and remove all jumpers.

p. Measure for continuity to ground at pin H of TJ2.

q. Measure for continuity between pin A of TJ2 and pin F of TJ3.

r. Measure for continuity between pin L of TJ2 and pin A of TJ1.

8-6. Test Set Check--Sensor Amplifier Mode

Connect test equipment as shown in figures 9-4 through 9-7 as applicable and accomplish following steps:

a. Set the MODE selector switch to SAU.

b. Set the CHANNEL selector to PITCH.

c. Set the FEEDBACK knob to 0.

d. Set the AC and DC POWER switches to OFF.

e. Measure continuity from pins V, J and W of TJ1 to ground. Measure continuity from both test points labeled GRD to ground. Measure continuity from pin g of TJ1 to pin M of TJ2 (dc power off).

f. Turn DC POWER switch ON. (DC amber indicator light is illuminated.)

g. Measure 27.5 ± 2 volts dc at pin h of TJ1.

h. Jumper pin n of TJ1 to pin h of TJ1. NO GO indicator light shall illuminate. Measure 27.5 ± 2 volts dc from R of TJ2 to ground. Remove jumper.

i. Jumper pin k of TJ1 to pin V of TJ1. Jumper

pin h of TJ1 to pin a of TJ1. Measure approximately 17.5 volts dc at TP3, TP4, and pin p of TJ1. Connect a signal generator of 1 Hz with a 10 volt peak to peak sine wave output between TP3 and TP4. Do not ground TP3 or TP4. Measure approximately 3 volt peak to peak at pin p of TJ1. Remove jumpers and turn DC POWER switch OFF.

j. Turn AC POWER switch ON and measure 115 volts rms at pin R of TJ1. Turn AC POWER switch OFF.

k. Jumper through 4.7K-ohm 1-watt resistor pin R of TJ1 to pin C of TJ1. Jumper pin S of TJ1 to pin V of TJ1. Jumper pin X of TJ1 to pin W of TJ1.

l. Turn AC POWER switch ON.

m. The ac voltage at TP5 as the FEEDBACK knob is rotated clockwise from 0 should increase to approximately 9.5 volts rms. Rotate the feedback knob counterclockwise from 0 and the ac voltage should increase to approximately 9.5 volts rms.

n. Repeat m above monitoring the ac voltage at pin Z of TJ1.

o. Turn the AC POWER switch OFF and remove all jumpers.

p. Measure continuity from pin q of TJ1 to TP1.

q. Measure continuity from pin f of TJ1 to TP2.

r. Measure $2K \pm 5\%$ ohms between pin q of TJ1 and pin f of TJ1.

s. Change CHANNEL select switch to ROLL.

t. Turn DC POWER switch ON. (DC amber indicator light will illuminate.)

u. Jumper pin h of TJ1 to pin d of TJ1. The NO GO indicator light will illuminate and there will be 27.5 ± 2 volts dc at pin D of TJ2. Remove jumper.

v. Jumper pin m of TJ1 to pin V of TJ1.

w. Jumper pin h of TJ1 to pin r of TJ1. Measure approximately 17.5 volts dc at TP3, TP4, and pin c of TJ1. Connect a signal generator of 1 Hz with a 10-volt peak-to-peak sine wave signal between TP3 and TP4. Do not ground TP3 or TP4. Measure 0.3 volt peak to peak at pin c of TJ1. Remove jumpers and generator. Turn DC POWER switch OFF.

x. Jumper pin T of TJ1 to pin V of TJ1. Jumper pin i of TJ1 to pin W of TJ1. Jumper through 4.7K-ohm 1-watt resistor pin R of TJ1 to pin B of TJ1.

y. Turn AC power ON. (AC indicator light is illuminated.)

z. The voltage at TP5 as the FEEDBACK knob is rotated clockwise from 0 should increase to approximately 9.5 volts rms. Rotate the FEEDBACK knob counterclockwise from 0 and the voltage should increase to approximately 9.5 volts rms.

aa. Repeat z above monitoring the ac voltage at pin D of TJ1.

ab. Turn the AC POWER switch OFF and remove jumpers.

ac. Measure continuity from pin e of TJ1 to TP1.

ad. Measure continuity from pin b of TJ1 to TP2.

ae. Measure $2K \pm 5\%$ ohms between pin e of TJ1 and pin b of TJ1.

af. Change the CHANNEL select knob to YAW.

ag. Turn the DC POWER switch ON. (Amber DC indicator light is illuminated.)

ah. Jumper pin h of TJ1 to pin P of TJ1. The NO GO indicator light will illuminate and there shall be 27.5 ± 2 volts dc at pin F of TJ2. Remove jumpers.

ai. Jumper pin s of TJ1 to pin V of TJ1. Jumper pin h of TJ1 to pin t of TJ1. Measure approximately 17.5 volts dc at TP3, TP4, and pin N of TJ1. Connect a signal generator of 1 Hz with a 10 volt peak to peak sine wave signal between TP3 and TP4. Do not ground TP3 or TP4. Measure approximately 0.3 volt peak to peak at pin N of TJ1. Remove jumpers and turn DC POWER switch OFF.

aj. Jumper pin U of TJ1 to pin V of TJ1. Jumper pin j of TJ1 to pin W of TJ1. Jumper through a 4.7K-ohm 1-watt resistor pin R of TJ1 to pin Y of TJ1.

ak. Turn AC POWER switch ON. (AC indicator light is illuminated.)

al. The voltage at TP5 as the FEEDBACK knob is rotated clockwise from 0 should increase to approximately 9.5 volts rms. Rotate the FEEDBACK knob counterclockwise from 0 and the voltage should increase to approximately 9.5 volts rms.

am. Repeat al above monitoring the ac voltage at pin E of TJ1.

an. Turn AC POWER switch OFF and remove jumpers.

ao. Measure continuity from pin M of TJ1 to TP1.

ap. Measure continuity from pin L of TJ1 to TP2.

aq. Measure $2K \pm 5\%$ ohms between pin L of TJ1 and pin M of TJ1.

ar. Jumper through a 68K resistor, a 10-volt peak-to-peak 400-Hz sine wave generator, to pin K of TJ1. Connect the other output lead of the generator to ground. Turn the AC and DC POWER switches ON and measure approximately 2.75 volts peak to peak at 400 Hz at pin K of TJ1. Turn the AC and DC POWER switches OFF.

8-7. Test Set Check—Control Panel/Sensor Amplifier Mode

Connect test equipment as shown in figures 9-4 through 9-7 as applicable and accomplish the following steps:

a. Set the MODE selector switch to CP/SAU.

b. Set the CHANNEL selector to PITCH.

c. Set the FEEDBACK knob to 0.

d. Set the AC and DC POWER switches to OFF.

e. Measure continuity from pins V and W of TJ1 and pin G of TJ2 to ground. Measure continuity from both test points labeled GRD to ground. Measure continuity from pin g TJ1 to pin M of TJ2 (dc power off).

f. Check continuity from pin P of TJ2 to ground. Press EMER DISENGAGE switch and continuity will disappear. Check continuity from pin N of TJ2 to pin h of TJ1.

g. Measure continuity to ground at pin H of TJ2.

h. Measure continuity between pin L of TJ2 and pin A of TJ1.

i. Measure continuity between pin A of TJ2 and pin F of TJ3.

j. Turn DC POWER switch ON.

k. Measure 27.5 ± 2 volts dc to ground at pin B and U of TJ2.

l. Jumper pin n of TJ1 to pin B of TJ2. NO GO indicator light will illuminate. Measure 27.5 ± 2 volts dc from pin R of TJ2 to ground. Remove jumper.

m. Jumper pin B of TJ2 to pin S of TJ2. Jumper pin G of TJ2 to pin a of TJ2. Green

ENGAGED light will illuminate. Remove Jumpers.

n. Jumper pin k of TJ1 to pin V of TJ1. Jumper pin B of TJ2 to pin a of TJ1. Measure approximately 17.5 volts dc at TP3, TP4, and pin p of TJ1. Connect a signal generator of 1 Hz with a 10-volt peak-to-peak sine wave output between TP3 and TP4. Do not ground TP3 or TP4. Measure approximately 0.3 volt peak to peak at pin p of TJ1. Remove jumpers, generator, and turn DC POWER switch OFF.

o. Turn AC POWER switch ON and measure 115 volts ac at pin T of TJ2. Turn AC POWER switch OFF.

p. Jumper pin T of TJ2 to pin V of TJ2. Turn AC POWER switch ON and AC indicator light will illuminate. Measure 115 volts ac at pin R of TJ1.

q. Turn AC POWER switch OFF and jumper through a 4.7K ohm/watt resistor pin R of TJ1 to pin C of TJ1. Jumper pin S of TJ1 to pin V of TJ1. Jumper pin X of TJ1 to pin W of TJ1.

r. Turn AC POWER switch ON.

s. The ac voltage at TP5 as the FEEDBACK knob is rotated clockwise from 0 should increase to approximately 9.5 volts rms. Rotate the FEEDBACK knob counterclockwise from 0 and the ac voltage should increase to approximately 9.5 volts rms.

t. Repeat s above, monitoring the ac voltage at pin Z of TJ1.

u. Turn AC POWER switch OFF and remove all jumpers.

v. Measure continuity from pin Q of TJ1 to TP1.

w. Measure continuity from pin f of TJ1 to TP2.

x. Measure $2K \pm 5\%$ ohms between pin q of TJ1 and pin f of TJ1.

y. Change CHANNEL select switch to ROLL.

z. Turn DC POWER switch ON.

aa. Jumper pin B of TJ2 to pin N of TJ2. Amber DC indicator light is illuminated.

ab. Jumper pin h of TJ1 to pin d of TJ1. The NO GO indicator light will illuminate and there shall be 27.5 ± 2 volts dc at pin D of TJ2. Remove jumpers from TJ1.

ac. Jumper pin m of TJ1 to pin V of TJ1.

ad. Jumper pin h of TJ1 to pin r of TJ1. Measure approximately 17.5 volts dc at TP3, TP4, and

pin c of TJ1. Connect a signal generator of 1 Hz with a 10 volt peak to peak sine wave signal between TP3 and TP4. Do not ground TP3 or TP4. Measure .3 volt peak to peak at pin c of TJ1. Remove all jumpers and generator.

ae. Jumper pin E of TJ2 to pin B of TJ2. Jumper pin b of TJ2 to pin G of TJ2. The green ENGAGED indicator light will illuminate. Turn DC POWER switch OFF and remove all jumpers.

af. Jumper pin T of TJ2 to pin V of TJ2. Jumper pin T of TJ1 to pin V of TJ1. Jumper pin i of TJ1 to pin W of TJ1. Jumper through a 4.7K-ohm 1-watt resistor pin R of TJ1 to pin B of TJ1.

ag. Turn AC POWER switch ON. (AC indicator light is illuminated.)

ah. The voltage at TP5, as the FEEDBACK knob is rotated clockwise from 0, should increase to approximately 9.5 volts rms. Rotate the FEEDBACK knob counterclockwise from 0 and the voltage should increase to approximately 9.5 volts rms.

ai. Repeat ah above monitoring the ac voltage at pin D of TJ1.

aj. Turn the AC POWER switch OFF and remove all jumpers.

ak. Measure continuity from pin e of TJ1 to TP1.

al. Measure continuity from pin b of TJ1 to TP2.

am. Measure $2K \pm 5\%$ ohms between pin e of TJ1 and pin b of TJ1.

an. Change the CHANNEL select knob to YAW.

ao. Turn the DC POWER switch ON. Jumper pin B of TJ2 to pin N of TJ2. (Amber dc indicator light is illuminated.)

ap. Jumper pin h of TJ1 to pin P of TJ1. The NO GO indicator light shall illuminate and there shall be 27.5 ± 2 volts dc at pin F of TJ2. Remove jumper from TJ1.

aq. Jumper pin s of TJ1 to pin V of TJ1. Jumper pin t of TJ1 to pin h of TJ1. Measure approximately 17.5 volts dc at TP3, TP4, and pin N of TJ1. Connect a signal generator of 1 Hz with a 10-volt peak-to-peak sine wave signal between TP3 and TP4. Do not ground TP3 or TP4. Measure approximately 0.3 volt peak to peak at pin N of TJ1. Remove all jumpers and generator.

ar. Jumper pin C of TP2 to pin B of TJ2. Jumper pin c of TJ2 to pin G of TJ2. The green

ENGAGED indicator light will illuminate. Remove jumpers and turn DC POWER switch OFF.

as. Jumper pin U of TJ1 to pin V of TJ1. Jumper pin j of TJ1 to pin W of TJ1. Jumper through a 4.7K ohm 1 watt resistor pin R of TJ1 to pin Y of TJ1.

at. Jumper pin T of TJ2 to pin V of TJ2. Turn AC POWER switch ON. (Ac indicator light is illuminated.)

au. The ac voltage at TP5 as the FEEDBACK knob is rotated clockwise from 0 should increase to approximately 9.5 volts rms. Rotate the FEEDBACK knob counterclockwise from 0 and the voltage should increase to approximately 9.5 volts rms.

av. Repeat *au* above monitoring the ac voltage at pin E of TJ1.

aw. Turn AC POWER switch OFF and remove all jumpers.

ax. Measure continuity from pin M of TJ1 to TP1.

ay. Measure continuity from pin L of TJ1 to TP2.

az. Measure $2K \pm 5\%$ ohms between pin L of TJ1 and pin M of TJ1.

ba. Jumper through a 68K resistor, a 10-volt peak-to-peak 400 Hz sine wave generator, to pin K of TJ1. Connect the other output lead of the generator to ground. Turn the AC and DC POWER switches ON and measure approximately 2.75 volts peak to peak at 400 Hz at pin K of TJ1. Turn the AC and DC POWER switches OFF.

8-8. Test Set Check—Control Channel Assembly Mode

Connect test equipment as shown in figures 9-4 through 9-7 as applicable and accomplish the following steps:

a. Set the MODE selector switch to MOD.

b. Set the CHANNEL selector switch to PITCH.

c. Set AC and DC POWER switches to OFF.

d. Measure continuity to ground from pins B and K of TJ4.

e. Measure continuity from pin T of TJ4 to TP2.

f. Measure continuity from pin E of TJ4 to TP1.

g. Measure $2K \pm 5\%$ ohms from pin E of TJ4 to pin T of TJ4.

h. Measure continuity between pin R of TJ4 and TP5.

i. Insert the extender cord into TJ4.

j. Turn AC POWER switch ON. (Ac amber indicator light will illuminate.) Measure the ac voltage from pin R of TJ4 to ground as the FEEDBACK knob is rotated slowly clockwise from 0. The voltage will increase from null to approximately 4 to 5 volts rms. Return the FEEDBACK knob to 0 and rotate it slowly counterclockwise. The voltage will increase from null to approximately 4 to 5 volts rms. Turn the AC POWER switch OFF.

k. Turn DC POWER switch ON and measure 27.5 ± 2 volts dc at pins S and D of TJ4. DC amber indicator light will also be illuminated. Turn DC POWER switch OFF and remove extender cord.

l. Jumper pin D of TJ4 to pin C of TJ4. Turn DC POWER switch ON and test set NO GO indicator light will illuminate. DC indicator light will also illuminate. Turn DC POWER switch OFF and remove jumper.

m. Insert extender cord and jumpered through a 2.2K-ohm $\frac{1}{4}$ -watt resistor from pin D of TJ4 to pin F of TJ4. Turn AC and DC POWER switches ON and observe waveform as shown in figure 8-1 at pin F of TJ4. Remove jumper.

n. Observe waveform as shown in figure 8-2 at pin H of TJ4. Turn AC and DC POWER switches OFF and remove extender cord.

o. Jumper pin J of TJ4 to pin K of TJ4. Turn DC POWER switch ON and measure approximately 10 volts at pin M of TJ4.

p. Measure approximately 10 volts dc at TP3.

q. Measure approximately 10 volts dc at TP4.

r. Connect a signal generator with 10-volt peak-to-peak sine wave signal output at 1 Hz to TP3 and TP4. Do not ground TP3 or TP4.

s. Measure approximately 0.3 to 0.4 volt peak to peak (1 Hz) out at pin M of TJ4. Remove jumper and signal generator. Turn DC POWER switch OFF.

t. Jumper pin L of TJ4 to pin K of TJ4. Turn AC and DC POWER switches on and connect the signal generator with 10-volt peak-to-peak sine wave signal output at 1 Hz to TP6 and ground.

u. Measure approximately 0.25-volt peak-to-peak output between pin P of TJ4 and ground.

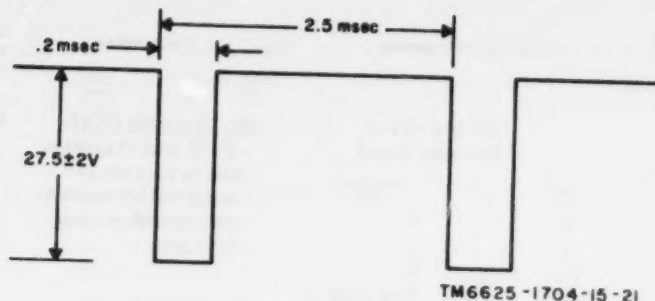


Figure 8-1. Waveform output at pin F of TJ4.

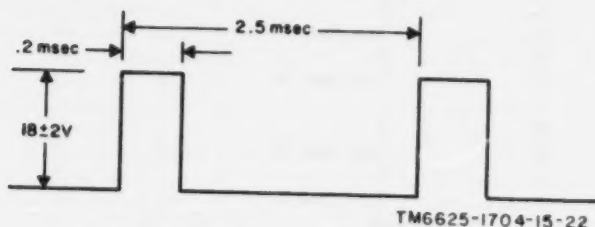


Figure 8-2. Waveform output at pin H of TJ4.

v. Jumper through a 68K resistor, a 10-volt peak-to-peak 400 Hz sine wave generator to pin N of TJ4. Connect the other output lead of the generator to ground. Measure approximately 2.75 volts peak to peak at 400 Hz at pin N of TJ4. Turn the AC and DC POWER switches OFF.

8-9. Test Set Check—Pylon Compensator Section

Connect test equipment as shown in figures 9-4 through 9-7 as applicable and accomplish the following steps:

a. The position of the MODE selector, CHANNEL selector or FEEDBACK knob does not affect this test. Set the AC and DC POWER switches OFF.

b. Measure continuity from pin A of TJ5 to ground.

c. Measure continuity from pin B of TJ5 to TP9.

d. Measure continuity from pin C of TJ5 to pin TP10.

e. Measure $510 \pm 5\%$ ohms from TP10 to pin E of TJ5.

f. Measure $510 \pm 5\%$ ohms from TP10 to pin H of TJ5.

g. Measure $510 \pm 5\%$ ohms from TP8 to pin F of TJ5.

h. Measure $510 \pm 5\%$ ohms from TP8 to pin G of TJ5.

i. Measure continuity from pin J of TJ5 to ground.

j. Measure continuity from pin K of TJ5 to TP7.

k. Measure $68K \pm 5\%$ ohms from pin K of TJ5 to ground.

l. Turn DC POWER switch ON. Measure 27.5 ± 2 volts dc from pin D of TJ5 to ground.

8-10. Checking Test Cables for Continuity

a. *Test Equipment.* Multimeter Simpson Model 260 or equivalent.

b. *Test Connections and Conditions.* Connect Multimeter (fig. 9-4) as follows:

- (1) Be sure FUNCTION switch is at OFF.
- (2) Clip (or touch) the COMMON lead to the male connector pin or to terminal of the test cable conductor to be checked.

Caution: Do not insert dc probe fully into connector contacts when checking for continuity; insert probe just far enough to make electrical contact. Contacts of connectors can be damaged by inserting dc probe too far.

c. *Procedure.*

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Step No.	Test equipment control settings	Cable assembly	Test procedure	Performance standard																																																																																	
1	FUNCTION: OHMS RANGE: R $\times$ 1																																																																																				
2	Same as step 1.....	570-091-011-1 Extender Board	Clip (or touch) COMMON lead of multimeter to plug pin and touch OHMS probe to corresponding receptacle pin.	Multimeter will indicate less than 1 ohm.																																																																																	
		<table><thead><tr><th>Plug pin</th><th>to</th><th>Receptacle pin</th></tr></thead><tbody><tr><td>B.....</td><td></td><td>B</td></tr><tr><td>C.....</td><td></td><td>C</td></tr><tr><td>D.....</td><td></td><td>D</td></tr><tr><td>D.....</td><td></td><td>Test Jack D</td></tr><tr><td>E.....</td><td></td><td>E</td></tr><tr><td>E.....</td><td></td><td>Test Jack E</td></tr><tr><td>F.....</td><td></td><td>F</td></tr><tr><td>F.....</td><td></td><td>Test Jack F</td></tr><tr><td>H.....</td><td></td><td>H</td></tr><tr><td>H.....</td><td></td><td>Test Jack H</td></tr><tr><td>J.....</td><td></td><td>J</td></tr><tr><td>K.....</td><td></td><td>K</td></tr><tr><td>K.....</td><td></td><td>Test Jack K</td></tr><tr><td>L.....</td><td></td><td>L</td></tr><tr><td>L.....</td><td></td><td>Test Jack L</td></tr><tr><td>M.....</td><td></td><td>M</td></tr><tr><td>M.....</td><td></td><td>Test Jack M</td></tr><tr><td>N.....</td><td></td><td>N</td></tr><tr><td>P.....</td><td></td><td>P</td></tr><tr><td>P.....</td><td></td><td>Test Jack P</td></tr><tr><td>R.....</td><td></td><td>R</td></tr><tr><td>R.....</td><td></td><td>Test Jack R</td></tr><tr><td>S.....</td><td></td><td>S</td></tr><tr><td>S.....</td><td></td><td>Test Jack S</td></tr><tr><td>T.....</td><td></td><td>T</td></tr><tr><td>T.....</td><td></td><td>Test Jack T</td></tr></tbody></table>	Plug pin	to	Receptacle pin	B.....		B	C.....		C	D.....		D	D.....		Test Jack D	E.....		E	E.....		Test Jack E	F.....		F	F.....		Test Jack F	H.....		H	H.....		Test Jack H	J.....		J	K.....		K	K.....		Test Jack K	L.....		L	L.....		Test Jack L	M.....		M	M.....		Test Jack M	N.....		N	P.....		P	P.....		Test Jack P	R.....		R	R.....		Test Jack R	S.....		S	S.....		Test Jack S	T.....		T	T.....		Test Jack T		
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Step No.	Test equipment control settings	Cable assembly	Test procedure	Performance standard																																																												
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t	-----	t																																																														
4	Same as step 1.....	570-091-026-1	Same as step 2.....	Same as step 2.																																																												

Plug pin	to	Receptacle pin
A	-----	Shield
B	-----	B
C	-----	C
D	-----	D
E	-----	E
F	-----	F
G	-----	G
H	-----	H
J	-----	J
K	-----	K

5 Same as step 1..... 570-091-027-1 Same as step 2..... Same as step 2.

Plug pin	to	Receptacle pin
A	-----	Shield
B	-----	B
C	-----	C
D	-----	D
E	-----	E
F	-----	F
G	-----	G
H	-----	H
L	-----	Shield
M	-----	M
N	-----	N
P	-----	P
R	-----	R
S	-----	S
T	-----	T
U	-----	U
V	-----	V
a	-----	a
b	-----	b
c	-----	c

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Step No.	Test equipment control settings	Cable assembly	Test procedure	Performance standard															
6	Same as step 1.....	570-091-028-1	Clip (or touch) COMMON lead of multimeter to plug pin and touch OHMS probe to corresponding terminal lug.	Multimeter will indicate less than 1 ohm.															
		<table><tr><th>Plug pin</th><th>to</th><th>Terminal spade lug</th></tr><tr><td>A.....</td><td></td><td>(115VAC 400Hz1Ø)</td></tr><tr><td>D.....</td><td></td><td>(+28VDC)</td></tr><tr><td>E.....</td><td></td><td>(GROUND)</td></tr><tr><td>F.....</td><td></td><td>Shield</td></tr></table>	Plug pin	to	Terminal spade lug	A.....		(115VAC 400Hz1Ø)	D.....		(+28VDC)	E.....		(GROUND)	F.....		Shield		
Plug pin	to	Terminal spade lug																	
A.....		(115VAC 400Hz1Ø)																	
D.....		(+28VDC)																	
E.....		(GROUND)																	
F.....		Shield																	

CHAPTER 9

SHIPMENT AND LIMITED STORAGE

9-1. General Information

For shipment or limited storage of the AN/ASM-338 check its physical and operating condition (para 4-5), stow all the accessories inside the case and close it (para 9-2), and put the AN/ASM-338 in a packing box (para 9-3).

9-2. Stowing Accessories Kit MK-1050/ASM in Case

After the AN/ASM-338 has been checked (para 4-5) and all components are at hand or accounted for (para 1-9), proceed as follows:

a. Stow the accessories (fig. 1-2) in the accessory compartment (fig. 9-1).

b. Stow a copy of this manual in the accessory compartment.

c. Close the accessory compartment by lowering the retaining plate into place and securing it with the two press type fasteners. (To lock a fastener, press it down and release.)

d. Place the top half of the case (fig. 1-1) next to the bottom half so that the hinges are mated, engage the hinge pins, and close the case by swinging the top half over and down on to the bottom half.

e. Secure the two latches as follows: hold each latch hook against the side of the case, pull the latch tab out and up, and make sure each latch hook engages the latch groove, then press latch tab downward.

9-3. Repackaging Electronic System Test Set AN/ASM-338 for Shipment or Limited Storage

The exact procedure for repackaging depends on the materials available and the conditions under which the equipment is to be shipped or stored. Whenever possible, adapt the following materials and procedures.

a. *Materials.* The materials listed in the chart below are required for repackaging Electronic System Test Set AN/ASM-338.

Materials	Quantity (ft)
Filler (2 in. thick by 14 in. wide)	3
Filler (1.5 in. thick by 10 in. wide)	5
Waterproof adhesive tape (2 in. wide)	3

b. *Repackaging Procedure.*

(1) Obtain or make a packing box (fig. 2-1) that is 14 inches long, 14 inches wide, and 14 inches high. The inside of the box should be lined with waterproof paper secured to the inside by liquid tar.

(2) Place a 2-inch thick pad of filler material in the bottom of the box, and put the AN/ASM-338 in the box.

(3) Fit 1.5-inch thick filler pads around the sides of the AN/ASM-338 and put a 2-inch thick filler pad on top of the equipment.

(4) Fold the top flaps over the top filler pad, and secure the flaps with waterproof tape.

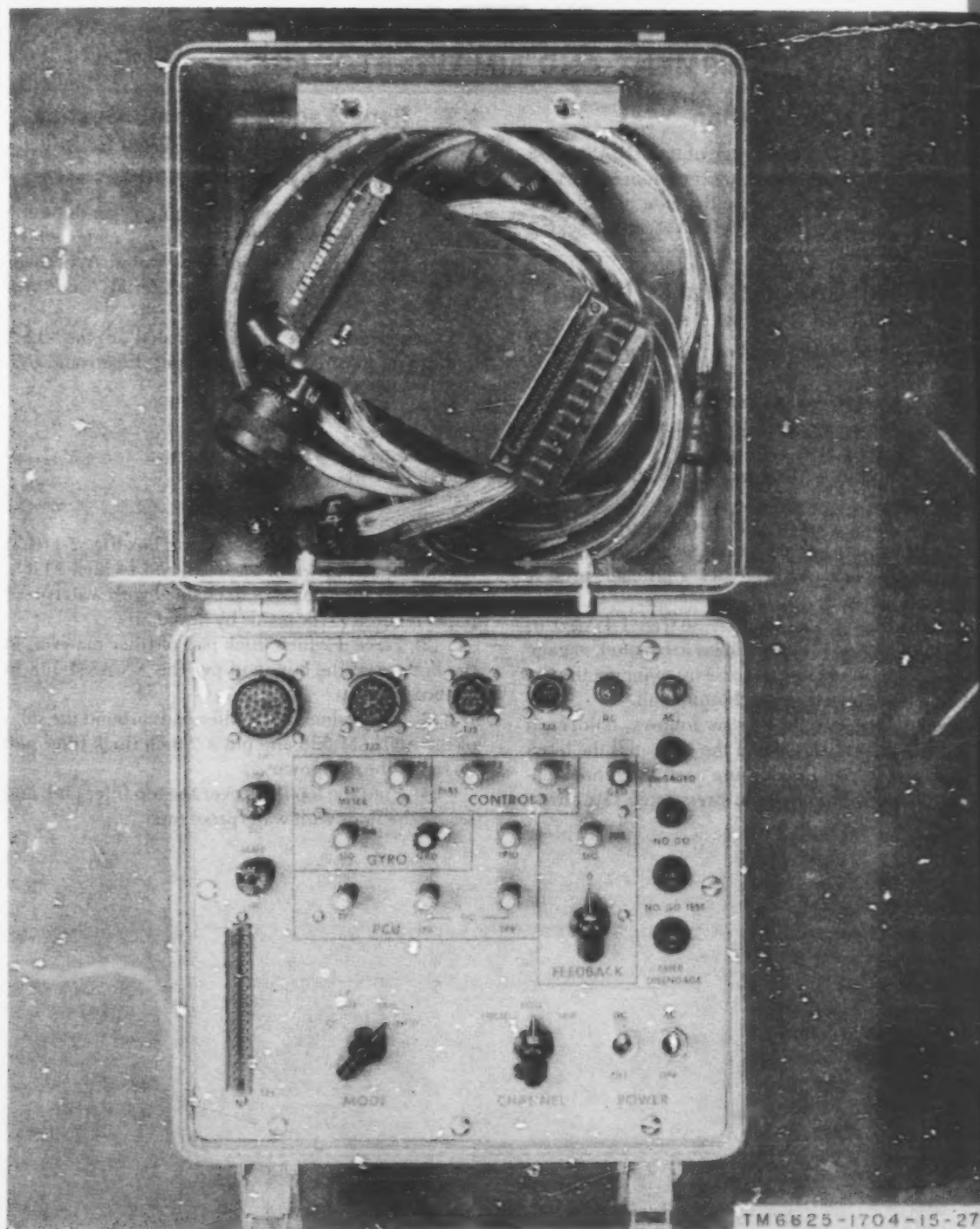


Figure 9-1. Electronic System Test Set AN/ASM-338
storage of accessories

MAPS
TRANSPPOSED TO
END OF VOLUME

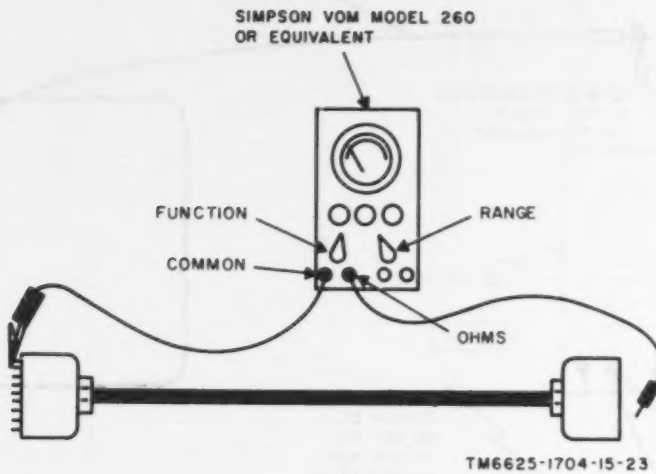
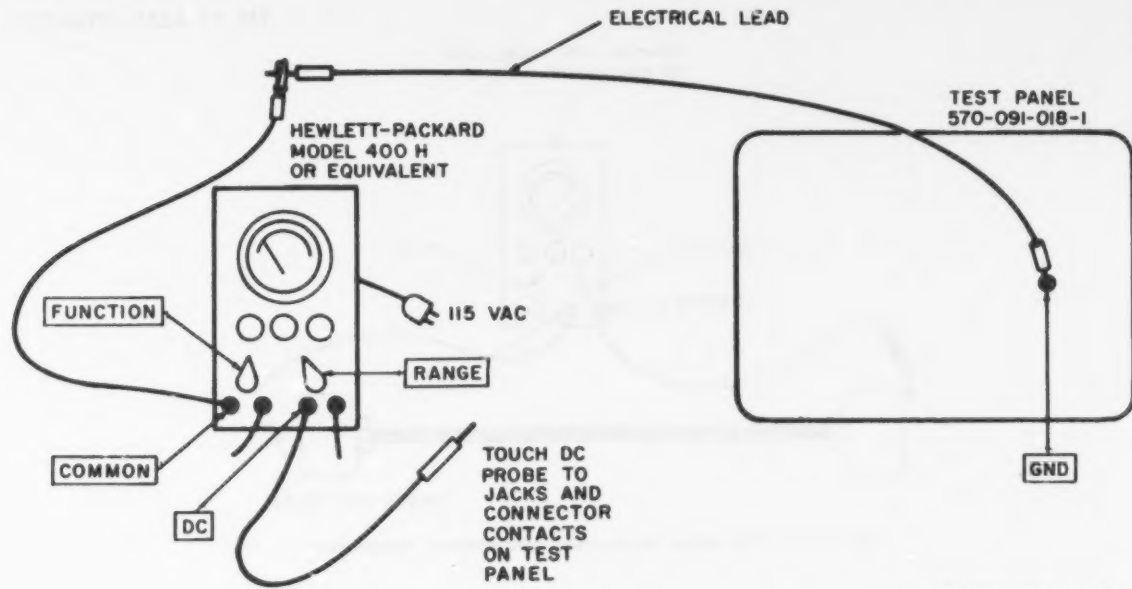
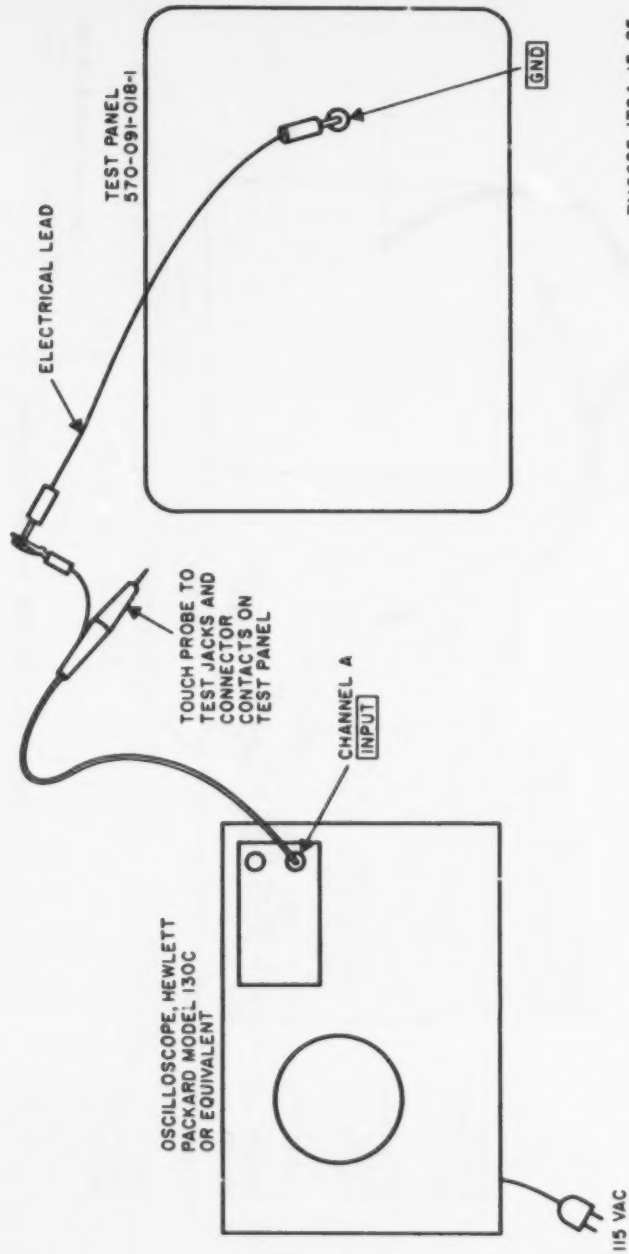


Figure 9-4. Test setup for checking continuity of equipment.



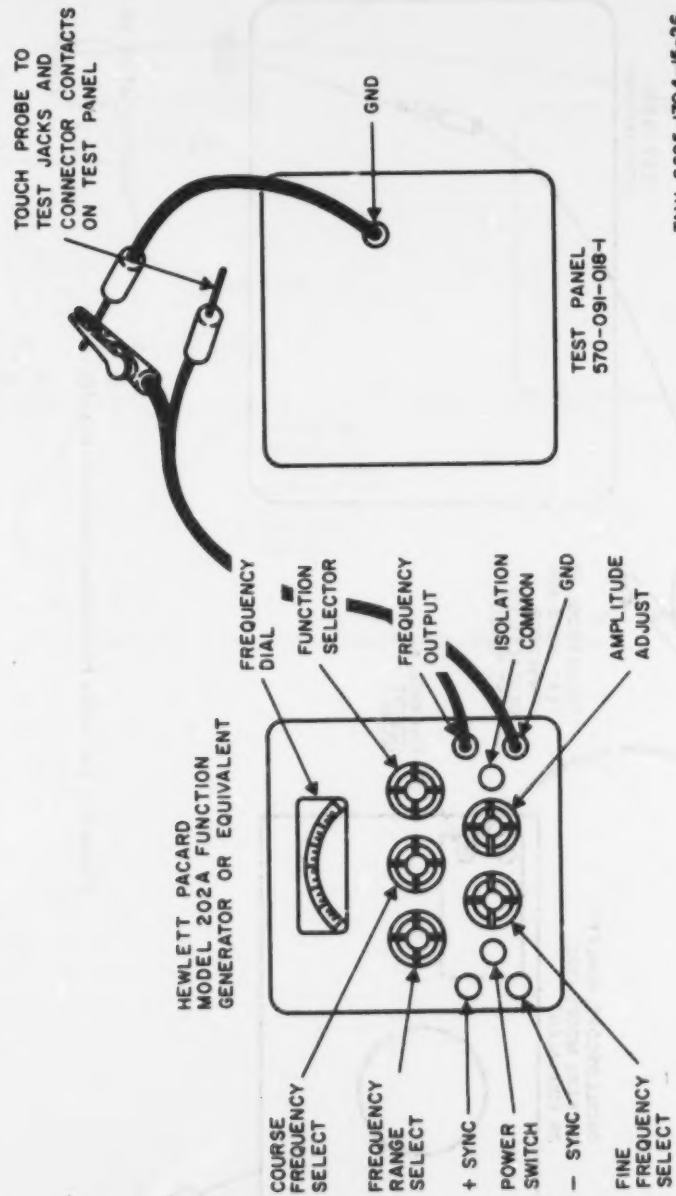
TM-6625-1704-15-24

Figure 9-5. Test setup for checking dc and ac voltages.



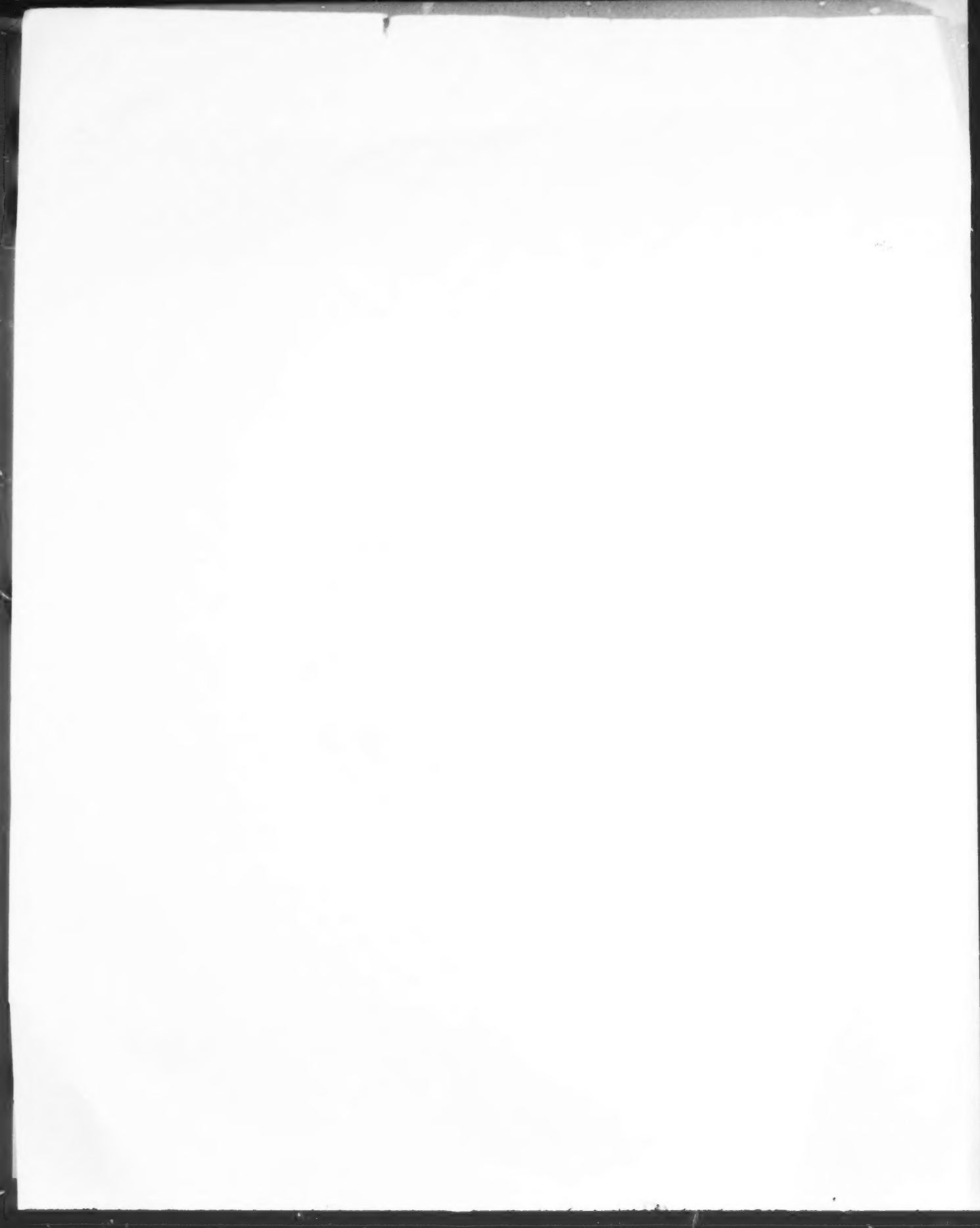
TM6625-1704-15-25

Figure 9-6. Test setup for checking waveform outputs.



TM11-6625-1704-15-26

Figure 9-7. Test setup for signal injection.



APPENDIX A

REFERENCES

The following references are available to the organizational and general support maintenance of Electronic System Test Set AN/A3M-338.

- | | |
|---|---|
| DA Pam 310-4 | Military Publications: Index of Technical Manuals, Technical Bulletins, Supply Manuals (types 7, 8, and 9), Supply Bulletins, and Lubrication Orders. |
| DA Pam 310-7 | Military Publications: US Army Equipment Index of Modification Work Orders. |
| SB 11-573 | Painting and Preservation Supplies Available for Field Use for Electronics Command Equipment. |
| SB 11-604..... | Replacement of Tool Kits, Radar and Radio Repairman TK-87/U and TK-88/U with Tool Kits, Electronic Equipment TK-105/G and TK-100/G. |
| SB 38-100..... | Preservation, Packaging, and Packing Materials, Supplies, and Equipment Used by the Army. |
| TM 11-1520-221-34 -- Direct Support and General Support Maintenance Manual: | |
| | Electronic Equipment Configurations, Army Model AH-10 Helicopter. |
| TB 746-10 | Field Instructions for Painting and Preserving Electronics Command Equipment. |
| TM 38-750 | The Army Maintenance Management System (TAMMS). |
| TM 740-90-1 | Technical Manual: Administrative Storage of Equipment. |
| TM 750-244-2 | Technical Manual: Procedures for Destruction of Electronics Material to Prevent Enemy Use (Electronics Command). |
| AR 746-1 | Color, Marking, and Preparation of Equipment for Shipment. |

APPENDIX C MAINTENANCE ALLOCATION

Section I. INTRODUCTION

C-1. General

This appendix provides a summary of the maintenance operations covered in the equipment literature for Test Set, Electronic System AN/ASM-338. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

C-2. Maintenance Functions

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean, preserve, drain, paint, or to replenish fuel/lubricants/hydraulic fluids or compressed air supplies.

d. Adjust. Maintain within prescribed limits by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

e. Align. To adjust specified variable elements of an item to about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipment used in precision measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment/system.

h. Replace. The act of substituting a serviceable

like-type part, subassembly, module (component or assembly) in a manner to allow the proper functioning of an equipment/system.

i. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module/component/assembly, end item or system.

j. Overhaul. That maintenance effort (service action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (e.g., DMWR) in pertinent technical manuals. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like-new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like-new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipment/components.

C-3. Column Entries

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in Column 2.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a "worktime" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time re-

quired to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "worktime" figures will be shown for each category. The number of man-hours specified by the "worktime" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column 4 are as follows:

- C—Operator/Crew
- O—Organizational
- F—Direct Support
- H—General Support
- D—Depot

e. Column 5, Tools and Equipment. Column 5 specifies by code, those common tool sets (not individual tools) and special tools, test, and support

equipment required to perform the designated function.

C-4. Tool and Test Equipment Requirements (Table 1)

a. Tool or Test Equipment Reference Code. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment for the maintenance functions.

b. Maintenance Category. The codes in this column indicate the maintenance category allocated the tool or test equipment.

c. Nomenclature. This column lists the noun name and nomenclature of the tools and test equipment required to perform the maintenance functions.

d. National/NATO Stock Number. This column lists the National/NATO stock number of the specific tool or test equipment.

e. Tool Number. This column lists the manufacturers part number of the tool followed by the Federal Supply Code for Manufacturers (5 digit) in parentheses.

SECTION II MAINTENANCE ALLOCATION CHART
FOR

TEST SET, ELECTRONIC SYSTEM AS/ASM-338

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT
			C	O	F	H	D	
00	TEST SET, ELECTRONIC SYSTEM AS/ASM-338	Inspect ¹		0.0				
		Test		0.2				1,6
		Replace		0.3				1,6
		Repair				1.5		1 thru 5,7
01	TEST SET, ELECTRONIC SYSTEM TS-2676/ASM-338	Inspect		0.2				
		Test				0.3		1 thru 5,7
		Replace		0.3				1,6
		Repair				1.5		1 thru 5,7
0101	CIRCUIT BOARD ASS'Y P/W 570-091-007 (97499)	Inspect				0.2		
		Test				0.2		1 thru 5,7
		Replace				0.2		1,7
		Repair				0.5		1 thru 5,7
0108	CIRCUIT BOARD ASS'Y P/W 570-091-029 (97499)	Inspect				0.2		
		Test				0.2		1 thru 5,7
		Replace				0.2		1,7
		Repair				0.5		1 thru 5,7
02	CASE, TEST SET CY-6470/ASM-338	Inspect		0.1				
		Replace		0.3				6
0201	CABLE ASS'Y, SPECIAL PURPOSE ELECTRICAL CX-10851/U	Inspect		0.1				
		Test		0.2				1
		Replace		0.2				1,6
		Repair				0.5		1,7
0202	CABLE ASS'Y, SPECIAL PURPOSE ELECTRICAL CX-10853/U	Inspect		0.1				
		Test		0.2				1
		Replace		0.2				1,6
		Repair				0.5		1,7
0203	CABLE ASS'Y, SPEC. PURPOSE ELECTRICAL CX-10853/U	Inspect		0.1				
		Test		0.2				1,6
		Replace		0.2				6
		Repair				0.5		1,7
0204	CABLE ASS'Y, SPEC. PUR. ELEC. CX-10854/U	Inspect		0.1				
		Test		0.2				1,6
		Replace		0.2				6
		Repair				0.5		1,7
0205	BOARD ASS'Y, EXTENDER MODULE MX-8096/ASM-338	Inspect ¹		0.2				
		Test ³		0.3				1
		Replace ²		0.2				1
		Repair				1.0		1,7

(1) Inspect refers to visual inspection of damage.

Change 2 C-1

(2) Replace, organizational, refers to checking fuses, lamps, knobs and external connections to the black box. Replace also refers to replacing this end item for purposes of higher category repair.

(3) Test refers to equipment operation check. Test also refers to electrical continuity check.

TABLE 1. TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR

TEST SET, ELECTRONIC SYSTEM AN/ASM-338

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O,H,D	MULTIMETER AN/USM-223	6625-00-999-7465	
2	H,D	VOLTMETER, ELECTRONIC ME-30E/U	6625-00-643-1670	
3	H,D	OSCILLOSCOPE AN/USM-281A	6625-00-228-2201	
4	H,D	GENERATOR, SIGNAL SG-321/U	6625-00-674-7097	
5	H,D	TEST SET, SEMI-CONDUCTOR TS-1836C/U	6625-00-159-2263	
6	O	TOOL KIT, ELECTRONIC EQUIPMENT TK-101/O	5180-00-064-5178	
7	H,D	TOOL KIT, ELECTRONIC EQUIPMENT TK-105/O	5180-00-610-8177	

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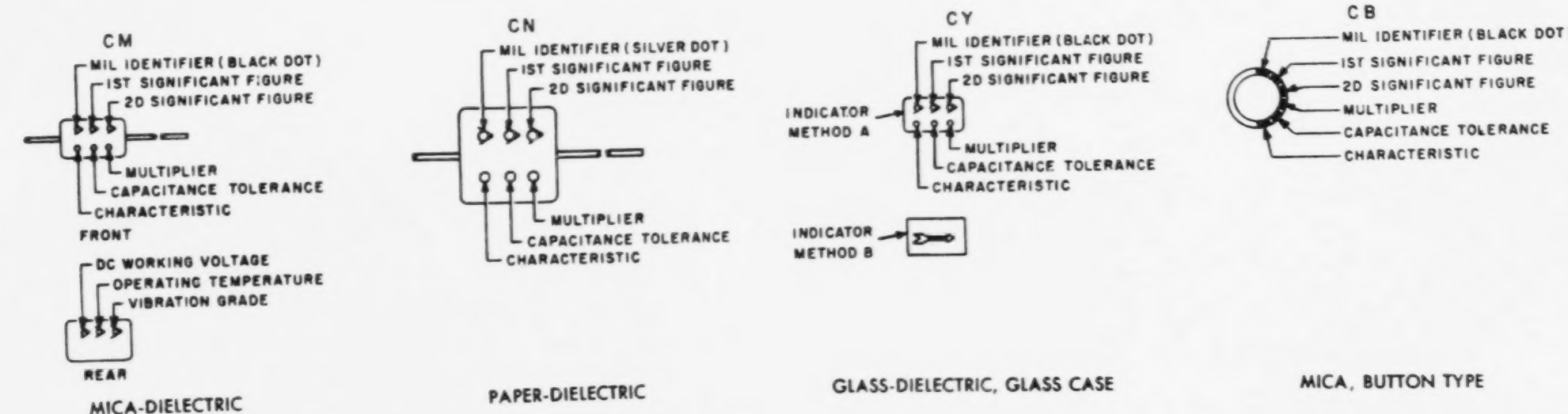
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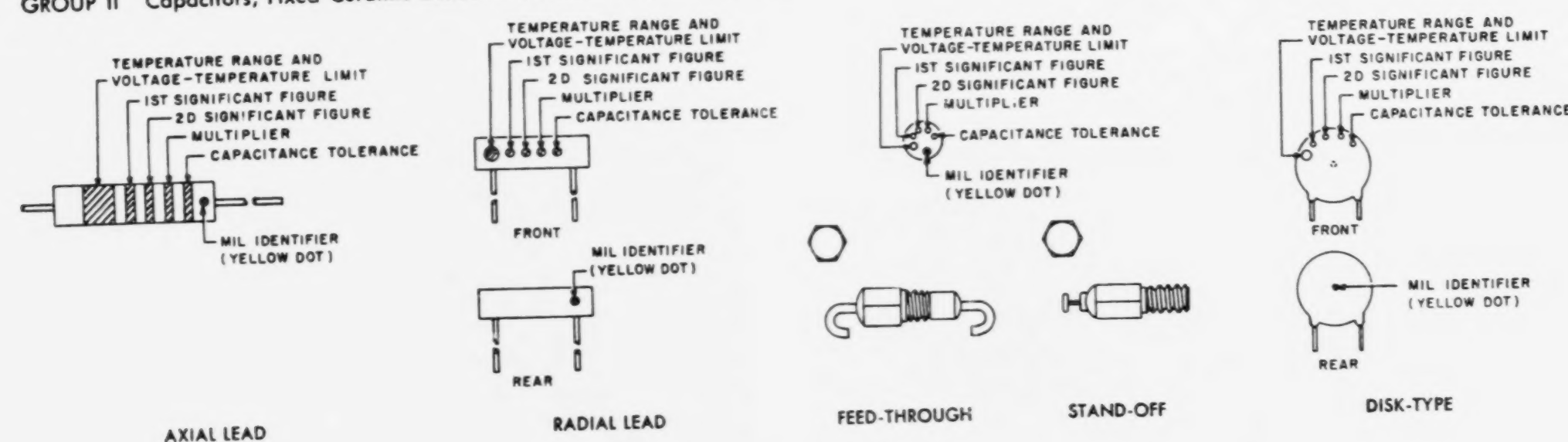
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COLOR CODE MARKING FOR MILITARY STANDARD CAPACITORS

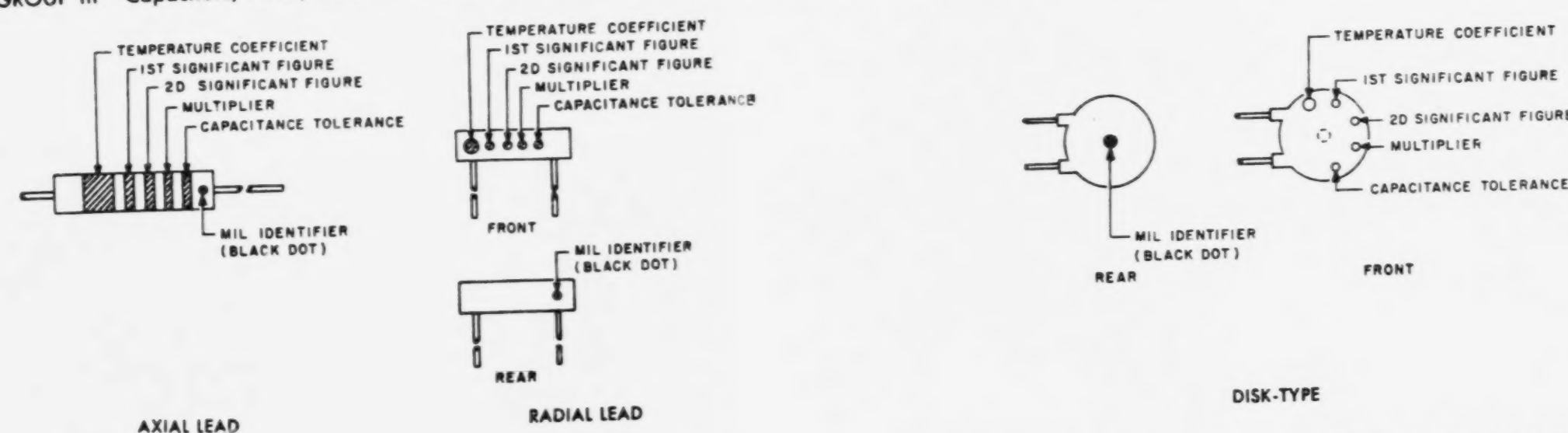
GROUP I Capacitors, Fixed, Various-Dielectrics, Styles CM, CN, CY, and CB



GROUP II Capacitors, Fixed Ceramic-Dielectric (General Purpose) Style CK



GROUP III Capacitors, Fixed, Ceramic-Dielectric (Temperature Compensating) Style CC



COLOR CODE TABLES

TABLE I - For use with Group I, Styles CM, CN, CY and CB

COLOR	MIL ID	1st SIG FIG	2nd SIG FIG	MULTIPLIER ¹	CAPACITANCE TOLERANCE				CHARACTERISTIC ²				DC WORKING VOLTAGE	OPERATING TEMP. RANGE	VIBRATION GRADE
					CM	CN	CY	CB	CM	CN	CY	CB			
BLACK	CM, CY, CB	0	0	1										-55° to +70°C	10-55 cps
BROWN		1	1	10					B	E		B		-55° to +85°C	
RED		2	2	100	± 2%		± 2%	± 2%	C			D	300		
ORANGE		3	3	1,000		± 20%								-55° to +125°C	10-2,000 cps
YELLOW		4	4	10,000					E				500		
GREEN		5	5		± 5%				F					-55° to +150°C	
BLUE		6	6												
PURPLE (VIOLET)		7	7												
GREY		8	8												
WHITE		9	9												
GOLD				0.1		± 5%	± 5%								
SILVER	CN				± 10%	± 10%	± 10%	± 10%							

TABLE II - For use with Group II, General Purpose, Style CK

COLOR	TEMP. RANGE AND VOLTAGE - TEMP. LIMITS ³	1st SIG FIG	2nd SIG FIG	MULTIPLIER ¹	CAPACITANCE TOLERANCE	MIL ID
BLACK		0	0	1	± 20%	
BROWN	AW	1	1	10	± 10%	
RED	AX	2	2	100		
ORANGE	BX	3	3	1,000		
YELLOW	AV	4	4	10,000		CK
GREEN	CZ	5	5			
BLUE	BV	6	6			
PURPLE (VIOLET)		7	7			
GREY		8	8			
WHITE		9	9			
GOLD						
SILVER						

TABLE III - For use with Group III, Temperature Compensating, Style CC

COLOR	TEMPERATURE COEFFICIENT ⁴	1st SIG FIG	2nd SIG FIG	MULTIPLIER ¹	CAPACITANCE TOLERANCE	MIL ID
BLACK	0	0	0	1		CC
BROWN	-30	1	1	10	± 1%	
RED	-80	2	2	100	± 2%	
ORANGE	-150	3	3	1,000		
YELLOW	-220	4	4			
GREEN	-330	5	5		± 5%	
BLUE	-470	6	6			
PURPLE (VIOLET)	-750	7	7			
GREY		8	8	0.01		
WHITE		9	9	0.1	± 10%	
GOLD	+100					
SILVER					± 1.0uuf	

- The multiplier is the number by which the two significant (SIG) figures are multiplied to obtain the capacitance in uuf.
- Letters indicate the Characteristics designated in applicable specifications: MIL-C-5, MIL-C-91, MIL-C-11272, id MIL-C-10950 respectively.
- Letters indicate the temperature range and voltage-temperature limits designated in MIL-C-11015.
- Temperature coefficient in parts per million per degree centigrade.

Figure 9-3. Color code marking for MIL-STD capacitors.



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